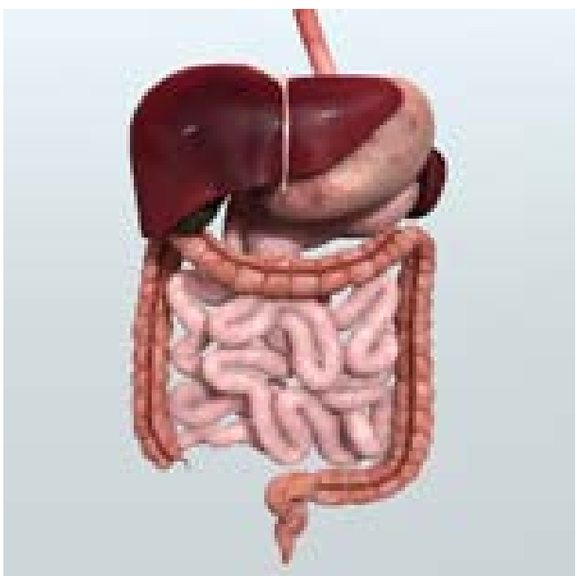
DIET IN GASTRO INTESTINAL AND LIVER DISORDERS

Unit 8

OBJECTIVES

This chapter will enable students

- To understand the functions of gastrointestinal system
- To learn and understand the causes, symptoms and diet therapy for diarrhea, constipation and peptic ulcer.
- To understand the functions of liver
- To learn and understand the causes, symptoms and diet therapy for hepatitis and cirrhosis



8.1 GASTROINTESTINAL DISORDERS

The gastrointestinal tract is an active organ which digests and modifies the nutrients for absorption. Gastro intestinal tract acts in unison with its glands and accessory organs like liver, pancreas and gall bladder to carry out the process. Gastrointestinal diseases refer to diseases involving gastrointestinal tract that is esophagus, stomach, small intestine and large intestine and accessory organs of digestion.

Functions of Gastrointestinal Tract

The gastro intestinal tract consists of esophagus, stomach, small intestine and large intestine. The functions of gastrointestinal system are:

- Ingestion of food,
- Propulsion of food,
- Digestion and absorption of food and
- Excretion of waste products.

The diseases of the upper gastrointestinal tract interfere with the intake of food by reducing appetite, inducing nausea and vomiting, evoking pain or by producing obstruction. The diseases of lower gastrointestinal tract impair the functions of intestinal tract and result in poor utilization of ingested food. The common disorders of stomach and intestine are diarrhoea, constipation and peptic ulcer.

8.1.1 DIARRHOEA

Diarrhoea is the leading cause of malnutrition and death in children under 5 years old. Diarrhoea is characterized by the frequent evacuation of liquid stools, accompanied by an excessive loss of fluid and electrolytes. Diarrhoea is the condition when there is rapid transit of intestinal contents through the small intestine, reduced enzymatic digestion of foods and decreased absorption of nutrients.

Types of diarrhoea

Diarrhoea can be acute or chronic in nature.

- **Acute diarrhoea** is an episode of recent origin. It is the condition with passage of watery stools without visible blood. Acute diarrhoea is caused by viral infection, bacterial toxins, bacterial infection, metal poisoning, side effects of drugs and structural or functional abnormalities of intestine.
- **Chronic diarrhoea** is when the duration of symptoms is longer than one month. It is characterized by frothy and acidic stools. Chronic diarrhoea is a result of long term diseases such as malabsorption syndrome, metabolic diseases, chronic deficiencies, allergy, cirrhosis of liver and carcinoma of small intestine and colon.

Causes of diarrhoea:

The causes of diarrhoea are:

- Overeating or eating of foods difficult to digest
- Viral infection (rotavirus)
- Bacterial infection (E.coli , Shigella)
- Bacterial toxins (Salmonella toxin)
- Protozoa infection (Giardia, Entamoeba histolytica)
- Malabsorption syndrome (Steatorrhea, Lactose intolerance)
- Metabolic disease (Diabetic neuropathy, Addison's disease)

DEHYDRATION

- One of the important consequences of diarrhoea is dehydration.
- Dehydration is loss of water and electrolytes from the body.
- Dehydration results in reduction in extracellular blood volume and hence a reduction in the total blood volume.
- Low blood volume is associated with hypotension and a low cardiac output.
- Severe dehydration leads to ischemic damage to the tissues and organs due to reduced supply of oxygen and nutrients.
- In severe dehydration, death may also occur.

Signs of dehydration: Inelastic and dry skin, dry lips and mouth, furred tongue, cold extremities, dizziness, weakness and anorexia

How to identify the signs of dehydration?

Skin turgor is a sign of dehydration. Skin pinch test is used to identify dehydration. Follow the steps given below:

- Pinch the skin on the back of patient's hand, lower arm or abdomen, between thumb and first finger. Do not use finger tips because it causes pain.
- Hold the skin for a few seconds and release.
- Observe how quickly the skin returns to its normal shape.
- If the skin is quick to return to normal, it is a sign that the patient is hydrated, whereas if it takes longer, the patient could be dehydrated.

- Allergy and Food sensitivity
- Carcinoma of small intestine and colon
- Cirrhosis of liver

Goals for dietary treatment

- To watch for the symptoms of dehydration and prevent dehydration
- To replace the fluid and electrolytes
- To remove the cause especially the infection
- To correct the nutritional deficiencies

Golden rule for diet treatment

FEEDING THE CHILD IS BETTER THAN STARVING THE CHILD

Dietary principle

A high calorie, adequate carbohydrate, adequate protein, low fat, low fibre, adequate vitamins and minerals, liberal fluid, bland and lactose free diet is prescribed for the patients.

Diet therapy for diarrhea

The therapy for diarrhoea consists of:

- Fluid and electrolyte management
- Dietary Management

1. Fluid and Electrolyte management

Early replacement of fluids and electrolytes through intravenous or oral route is necessary to reduce mortality associated with dehydration. Severe cases of diarrhoea need administration of dextrose and electrolyte solutions intravenously and hospitalization. Mild cases of diarrhoea can be treated at home by giving fluids like tender coconut water, buttermilk and rice kanji. This is referred to as the Oral Rehydration Therapy (ORT).

DO IT YOURSELF!

ORAL REHYDRATION THERAPY (ORT)

Oral Rehydration Therapy refers to providing oral salt solutions to the patients. An oral rehydration solution can be prepared by mixing 1 teaspoon of salt, 3 tablespoons of sugar with or without lemon juice in a litre of drinking water.

2. Dietary Management

Adequate nutritional care is important to ensure enhanced recovery and proper rehabilitation. The nutrient requirements and quality of diet may not be the same for all forms of diarrhoea. The demand for fluids and electrolytes are high during acute diarrhoea whereas the demand for macro and micro nutrients increases along with fluids and electrolytes during chronic diarrhoea.

Energy

During acute phase of diarrhoea, the intake of calories can be adjusted gradually as per patient's tolerance. A gradual increase of 200-300 kcal can be achieved easily. Easily digestible carbohydrates can be given for patients to improve calorie intake.

Protein

Protein requirements are increased in chronic diarrhoea because of tissue depletion. In chronic diarrhoea, an additional 10 g of protein is recommended above the normal requirement. In acute diarrhoea, adequate protein that is 1g per kg body weight is recommended. Protein rich foods that are easily digested like minced meat, egg, skimmed milk can be given for the

Oral Rehydration Solution (ORS)

Sodium Chloride	= 3.5g
Glucose	= 20g
Sodium bi carbonate	= 2.5g
Potassium chloride	= 1.5g

Dissolved in one litre of potable water

WHO STANDARD FORMULATION

ORS provides

Glucose	= 2g
Sodium	= 90 mEq/L
Potassium	= 20 mEq/L
Chloride	= 80 mEq/L
Bicarbonate	= 30 mEq/L
Osmolality	= 330 mOsm/L

patients. Milk is restricted as it is a high residue diet. Fermented, cooked and diluted milk products are tolerated well than whole milk by the patients.

Fat

Fat is restricted as it may aggravate diarrhoea. Invisible fat (fat in an invisible form or already present in the food) like egg yolk, whole milk, paneer, curd, meat, sea foods etc is preferred more as compared to visible fat like oils and dalda. Fried food must be avoided.

Carbohydrate

Adequate carbohydrate should be given (60-65% of total calories). Easily assimilated carbohydrates are preferred. Potato, yam, sago, semolina, refined flour, honey, jaggery can be given for patients with diarrhoea to reduce the volume of stools.

Fibre

Low fibre diet is prescribed for the patient. Insoluble fibre in the form of skins, seeds and bran should be avoided to minimize irritation of gastro intestinal tract. Soluble fibre foods like stewed fruits and vegetables help in binding the stool and favour beneficial gut health.

Vitamins and Minerals

The water soluble vitamins especially folic acid, vitamin B_{12} and vitamin C should be supplemented. Fat soluble vitamins (A, D, E and K) are supplemented if fat is not digested and lost in stools. Sodium and potassium should be replaced.

Fluids

Intake of fluids should be liberal to minimize risk of dehydration. Diluted drinks are preferred than concentrated drinks.

Activity : 1

Circle the food which can be given for diarrhoea from the following.

1. Curd 2. Fried foods 3. Milk
4. Biriyani 5. Egg yolk

Stages of diet therapy in Chronic Diarrhoea

Level I diet
Low milk diet, curd, rice and milk
Level II diet
Milk free diet, amylase rich food
Level III diet
Lactose free, Sucrose free, starch free diet, Soy, chicken and egg

HOME REMEDIES
For Diarrhoea

- Thyme can settle churning stomach and kill bacteria. Add a teaspoon of thyme in one cup of boiling water, steep, strain and drink.
- A plate of carrots can soothe the digestive system
- Mix cumin seed powder with curd and take it three times a day

Foods to be included and avoided for Diarrhoea

Foods to be included	Foods to be avoided
Buttermilk	Whole milk
Thin dal and soft cooked dal	Legumes, nuts
Boiled Egg	Fried foods
Vegetable soups	Raw vegetables
Vegetable juices or cooked pureed vegetables	Pickles
Fruit juices	Coarse cereals
Banana, Apple, Papaya and Melons	Whole grain breads
Coconut Water	
Kheer, homemade jelly and custard	
Soft cooked rice and refined cereals	

Simple dietary tips for diarrhoea patients!

- Include plenty of fluids like fruit and vegetable juices, soups, thin dals and coconut water
- Small and light meals is preferred than three big meals to replenish the lost nutrients
- Boiling, steaming, baking, pressure cooking should be encouraged
- Include banana and apple as they are rich in potassium
- Restrict consumption of milk and milk products
- Try to avoid raw vegetables
- Avoid fried foods

8.1.2 CONSTIPATION

Constipation is defined as difficulty or infrequent passage of stools. Patients with constipation have hard stools, physical discomfort of straining and incomplete evacuation. It usually occurs in children, adolescents and adults taking low fibre diets, patients who are confined to bed and in elderly people.

There are three types of constipation. These are:

a. Atonic constipation

In atonic constipation, there is loss of muscle tone. This results in weak peristalsis. The causes of atonic constipation are lack of fluids, low fibre diet, irregular defecation habit, poor personal hygiene, sedentary lifestyle and excessive use of laxatives

b. Spastic constipation

Constipation due to excessive tonicity of the colon wall is known as spastic constipation. The increase in muscle tone in colon causes spasms in intestine which leads to constipation.

The spasm is usually accompanied by pain, flatulence and abdominal cramps.

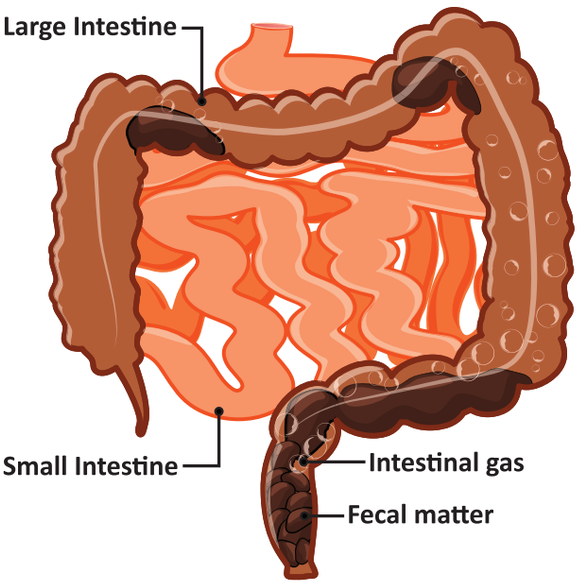
c. Obstructive constipation

Constipation occurs due to any obstruction in the colon. The obstruction is caused by cancer or inflammation which narrows the lumen resulting in constipation

Causes of constipation

The common causes of constipation are:

- Lack of fibre in diet
- Insufficient intake of fluids
- Poor elimination habits
- Ignoring the urge to defecate
- Overuse of laxatives
- Side effects of medications
- Lack of exercise
- Pregnancy
- Hypothyroidism
- Other causes like celiac disease, duodenal ulcer, gastric cancer, anal fissures and hemorrhoids



Complications Associated With Constipation

Anal fissure	Diarrhoea
Hemorrhoids	Fecal incontinence
Rectal hernia	Rectal bleeding

Activity : 2

Self-monitoring! Are you at risk?

- What is the fibre rich food you had today?
- how many minutes did you exercise today?
- how many glasses of water did you have today?
- do you take any medications on your own without consulting doctor?

Goals for dietary and lifestyle management

- To follow regular meal timings
- To increase the intake of fluids
- To include high fibre diet
- To increase physical activity
- To develop regularity in bowel evacuation

Dietary principle

Adequate calorie, adequate protein, adequate fat and carbohydrates, high fibre and high fluid diet are prescribed for patients. Vitamins and minerals are given according to the prescribed daily requirement of an individual.

Diet therapy for constipation

The primary nutrition therapy for constipation is including adequate amounts of dietary fibre, both soluble and insoluble and adequate amounts of fluids.

Energy

Energy intake should be adequate to meet the nutritional needs of the patient. The patient should be provided with 2000 to 2500 kcal per day. The calorie should be provided by carbohydrate and fat.

Protein

Adequate or normal protein diet can be given for patient. Protein requirement of 1g/kg body weight/ day is recommended for the patients. Patients can be given 60g of protein per day.

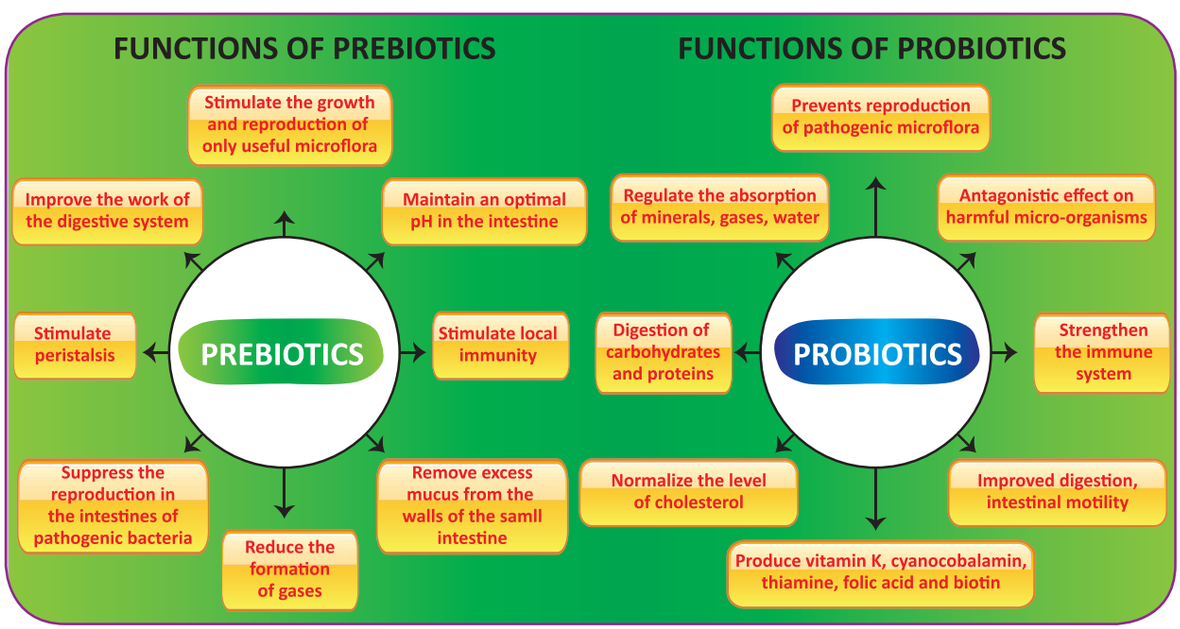


Fig 8.1 : Need for Prebiotics and Probiotics for Gut Health

Carbohydrate

Carbohydrate intake should be around 60-65 % of total calories. Whole wheat and millets are preferred than refined foods for the patients. The insoluble fibre present in whole grains, pulses, fruits and vegetables help in increasing the intestinal bulk.

Fat

Adequate fat is given for the patient. Fats are calorie dense and therefore must be included to meet the energy needs. Fat intake of 20-25% of total calories can be recommended. Fat containing foods such as bacon, meat, butter, ghee, cream etc must be included in the diet as the fatty acids present in them stimulate mucosal movements.

Fibre

A high fibre diet which includes both soluble and insoluble fibres is recommended for the patients. Fibre requirement for adult women is 25g per day, for adult men is 38g and for children, it is approximately 19 to 25 g daily. Bran and powdered fibre commercial supplements may be helpful for people who do not consume enough fibre in the diet.

Fluid

High fluid foods may help in constipation. Tea and coffee should be taken in moderation. Clear soups or cream soups are nourishing and provide good amount of electrolytes and water.

EXERCISE WHEN YOU ARE CONSTIPATED

Constipation is common in adolescents. Insufficient physical activity and sedentary lifestyle are positively associated with constipation. Awareness on increasing physical activity and reduction in sedentary lifestyle may help to relieve constipation in adolescents. Exercise stimulates the contractions of muscle in the large intestines thereby relieving the constipation.

Activity : 3

Categorize the following foods into prebiotics and probiotics

Food stuffs	Prebiotics	Probiotics
Whole grains		
Curd/Yoghurt		
Legumes		
Fermented vegetables		
Fruits & vegetables		

Foods to be included and avoided for Constipation

Foods to be included	Foods to be avoided
Whole wheat, maize and millets	Refined foods, pastas, maida, semolina, baked products, pizza and biscuits
Pulses such as rajma, whole green gram	Deep fried foods
Green leafy vegetables, peas, beans	Pureed vegetables and fruits
Guavas, pomegranate, apples, cherries, pear and peaches	
Clear soups, juices	

HOME REMEDIES
For Constipation

- Prune juice is a very good laxative
- Aloe vera is very good for chronic constipation and detoxing the system generally.
- Taking 2 to 5 tablespoon a day of psyllium seeds along with lot of water can help in bowel movements

Activity : 4

A 10 year old boy was admitted in the hospital with complaints of severe abdominal pain for the past three days and has pain during evacuation. He was passing hard and dark coloured stools.

- Identify the disease condition of the boy.
- Give the dietary guidelines for the boy

8.1.3 PEPTIC ULCER

Peptic ulcer is a term used to describe any localized erosion or necrosis of the mucosal lining that comes in contact with gastric juice. Mostly ulcer is formed in lower part of oesophagus (oesophageal ulcer), lesser curvature of the antrum of stomach (gastric ulcer) and first portion of duodenum (duodenal ulcer).

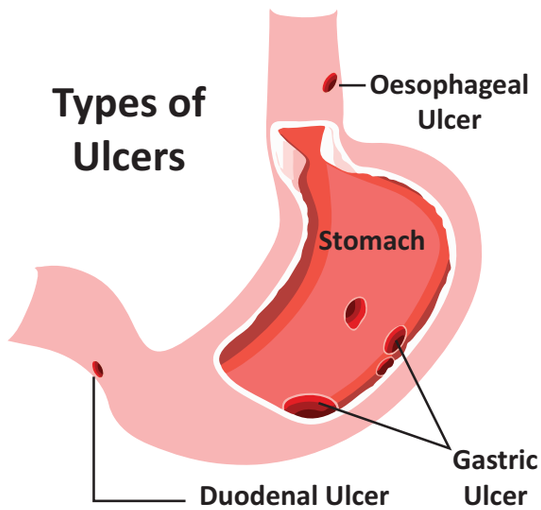


Fig 8.2 : Types of Ulcers

Causes of peptic ulcer

Over secretion of gastric juices is one of the direct causes of peptic ulcer disease. The other common causes are as follows :

a) Heredity: Peptic ulcer is not genetic disorder but patients with a family history of peptic ulcer have higher chances of developing the ulcers.

b) Helicobacter pylori infection: Chronic inflammation due to Helicobacter pylori is a major cause for gastric ulcers. The gastritis can stimulate hyper secretion of gastric juices causing erosion of the lining resulting in ulcers

c) Non-steroidal Anti - Inflammatory Drugs (NSAIDs): Excessive use of pain killers can cause ulcers. Prostaglandin protects the mucosal lining of the stomach. NSAIDs block and reduce the production of prostaglandins.

d) Excessive alcohol intake: Alcohol consumption increases risk with helicobacter pylori infection. Alcoholic beverages erode the protective stomach lining and lead to inflammation or bleeding.

e) Smoking and tobacco use: Nicotine and tobacco may increase the risk of developing ulcers.

f) Gender: Higher incidence of ulcers are seen in males than in females.

g) Dietary factors: Eating at irregular intervals, long gaps between each meal, high intake of spices, coffee or caffeine increases the risk of peptic ulcers.

h) Poor sanitation: Unsafe drinking water and Poor sanitation increases the risk of infection with Helicobacter pylori.

i) Stress and Anxiety: Emotional disturbances, fear, stress, worry and anxiety increases the chances for ulcers because of hypersecretion and hypermotility of the stomach.

Signs and symptoms of peptic ulcer

Ulcer may or may not give symptoms. A gastric ulcer may give epigastric pain during the meal. Duodenal ulcer pain may manifest after 2-3 hours of the meal. The symptoms also vary with the age of the patients.

Peptic Ulcer Disease

Pathogenesis

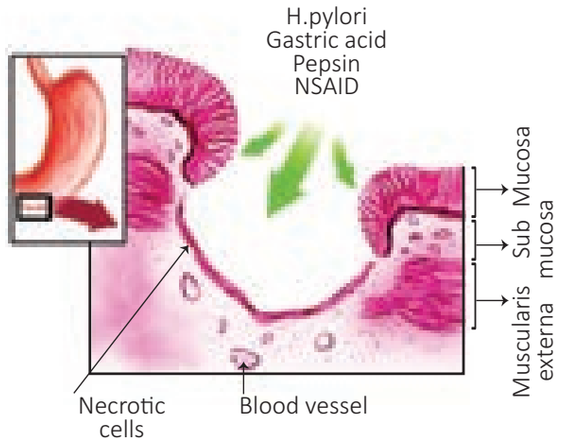


Fig 8.3 : Pathogenisis of Peptic Ulcer

The common symptoms are

- Abdominal pain
- Abdominal discomfort
- Nausea
- Vomiting
- Hematemesis (blood vomit)
- Heart burn
- Loss of appetite
- Weight loss
- Melena (dark and foul smelling stool)

COMPLICATIONS OF PEPTIC ULCER!

- Gastrointestinal bleeding
- Gastric outlet obstruction
- Perforation in the lining
- Penetration of ulcers
- Stomach Cancer

Activity : 5

Know the drugs!

List any five NSAIDs which are commonly present in medicine cabinet.

DO YOU KNOW?

Zollinger Ellison Syndrome

It is a type of cancer which releases gastrin hormone that causes excess acid production leading to peptic ulcer.

Goals for dietary and lifestyle management

- To restore good nutritional status
- To reduce the signs and symptoms of ulcer
- To neutralize acids
- To decrease the acid secretion
- To preserve the epithelial lining of the GI tract to the destructive action of gastric juices

Dietary principle

Adequate calorie, high protein, adequate fat, adequate carbohydrates, low fibre, adequate fluid and bland diet is prescribed for the patients. Vitamins and Minerals are given as per the prescribed daily requirement of the individual.

Diet therapy for Peptic Ulcer

It is important to provide rest to the affected area and support tissue healing. The key to the management of peptic ulcer is the judicious choice of drug therapy and dietary modifications.

Good nutritional status and good dietary regime can help in reducing the impact of the disease on the overall wellbeing of the patient.

Energy

Adequate energy should be taken to maintain the ideal body weight of the patient and to prevent weight loss and spare the proteins for healing the ulcer.

Protein

High protein intake ensures synthesis of new tissues essential for healing. Milk protein is valued for its buffering action. The buffering action is effective only for 20-60 minutes

after its ingestion. After some time, it may stimulate acid production because of high calcium content. Therefore, use of milk should be limited. It gives relief for short period only. Proteins from egg, chicken, cheese and fish is beneficial for regeneration of tissue.

Fat

Fats delay the gastric emptying. Poly unsaturated fatty acids have been found to be effective against duodenal ulcer by inhibiting the growth of Helicobacter pylori. Around 25-30g of visible fat may be given to the patient. Fried foods should be avoided.

Carbohydrate

Carbohydrates should provide around 55-65% of the total calories. Simple and Complex carbohydrates can be consumed in soft well-cooked form.

Fibre

Low fibre may be given for the patient. Soluble fibre is more beneficial than insoluble fibre. The presence of fibre in the diet is preferred because it delays gastric emptying time and hence prevents the mucosal damage by acidic gastric juice. The fibre requirement is around 20g per day for the patient.

BLAND DIET!

Mechanically irritating foods

Foods which contain indigestible carbohydrates or roughage;

Eg. Whole grains, Raw vegetables and fruits

Chemically irritating foods

Foods which have a stimulatory effect on the gastric secretions;

Eg. Alcohol, Meat extracts, Caffeine, Spicy foods, Chillies, garlic Powder.

Thermally irritating foods

Foods which are consumed at extremely hot or cold temperatures;

Eg. Hot broths or soups, Iced liquids.

Bland diet

A diet which contains mechanically, chemically and thermally non-irritating foods that are generally soft, well cooked, low in dietary fibre and not spicy.

Foods to be included and avoided for Peptic Ulcer

Foods to be included	Foods to be avoided
• Soft cooked rice	• Whole grains
• Legumes, Flax seeds, nuts, oats, barley	• Pulses, Soyabean
• Oily fish, egg, chicken	• Raw vegetable and fruits
• Cheddar cheese, Almonds,	• Cabbage, cauliflower, onions
• Vegetable juices or cooked pureed vegetables	• Chillies, Garlic Powder,
	• Coffee or Tea
	• Alcohol

HOME REMEDIES

For Peptic Ulcer

- Raw Cabbage juice is an old folk remedy for ulcers.
- Banana powder has been used to treat ulcers in India

8.2 LIVER DISORDERS

Liver is the largest gland in the body weighing around 1500g. The liver has the ability to regenerate itself. Approximately 1500ml of blood per minute circulates through the liver and exits via left and right hepatic veins. The liver is integral part of all metabolic functions in the body.

Functions of Liver

The main functions of liver include:

- Metabolism of carbohydrates, protein and fats
- The liver plays a major role in storage, activation and transport of many vitamins and minerals
- It helps in the formation and excretion of bile, conversion of ammonia to urea and metabolism of steroids.
- The liver converts carotene to retinol, a form of vitamin A. It synthesizes heparin which prevents coagulation of the blood.

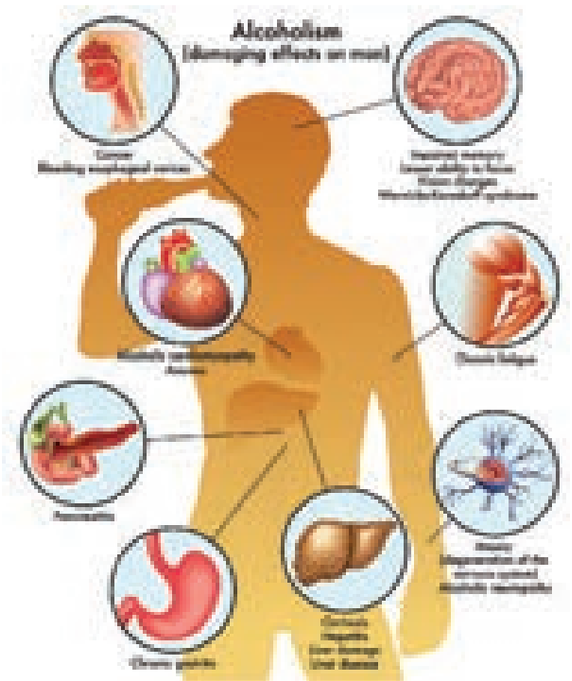
Any inflammation, infection or damage to liver hinders its functions and the liver becomes sluggish. Some of the common liver disorders are hepatitis, cirrhosis of liver, hepatic encephalopathy and liver cancer.

How does excess alcohol consumption causes liver disease?

Chronic abuse of alcohol has a hepatotoxic effect leading to malnutrition in an individual. Excess alcohol consumption can harm the liver causing inflammation and necrosis due to fat accumulation in the cells. A toxic byproduct of excessive alcohol intake is acetaldehyde which causes damage to the structure and function of the mitochondria in body cells, particularly in the liver. This reduces the normal functioning of liver causing severe vitamin and protein deficiency.

Excess alcohol intake can cause multiple complications such as:

- Most serious complication is vitamin and mineral deficiencies. Thiamine or vitamin B_1 deficiency is the most common vitamin deficiency and can cause Wernicke's encephalopathy. Severe vitamin A deficiency can also occur, leading to night blindness. In addition, deficiencies of folic acid, vitamins B_6, C, D, E and K are common. In regard to minerals, alcoholics may suffer from calcium, magnesium, phosphate and zinc deficiency.
- Protein deficiency in alcoholics can cause encephalopathy and result in coma
- Clotting defects can occur. This precipitates excess bleeding
- Portal hypertension resulting in ruptured varices and ascites.
- It can also affect kidney, heart and the blood vessels



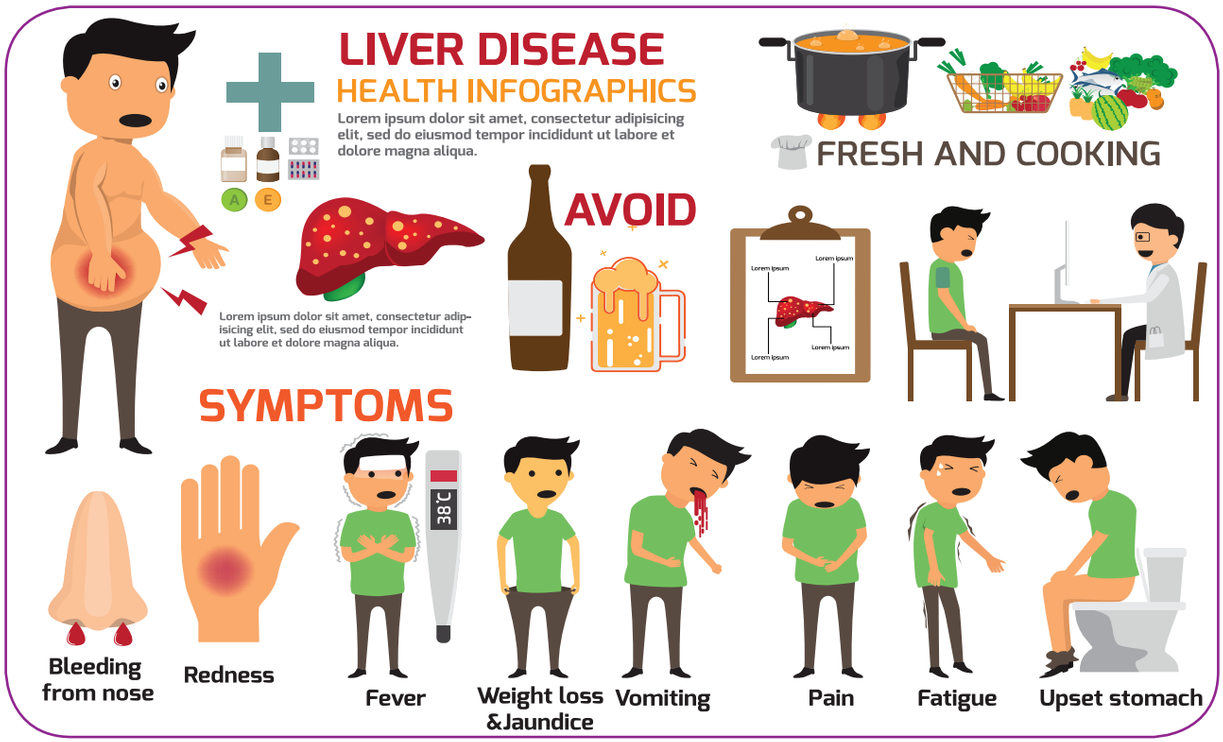
8.2.1 HEPATITIS

Diseases of the liver can be acute or chronic, inherited or acquired. Hepatitis is an inflammation of liver. It is classified as follows:

1. Acute Viral Hepatitis
2. Chronic Hepatitis

DO YOU KNOW?

Hepar' is the Greek term for liver. Liver related medical terms actually start with 'hepatic or hepato'. According to Greeks, the liver is the organ which is closest to divine presence as it is considered a home of all emotions



a) Acute Viral Hepatitis

Acute viral hepatitis is a sudden onset of inflammation in liver. It is caused by hepatitis viruses A, B, C, D and E. Hepatitis A and E are infectious which is spread by fecal oral route. Hepatitis B, C and D are transmitted through blood and body fluids.

The general symptoms of viral hepatitis are:

- Fever
- Arthalgia
- Arthritis
- Rash
- Malaise
- Fatigue
- Myalgia
- Anorexia
- Nausea
- Vomiting
- Jaundice (Icterus)

Chronic Hepatitis

When hepatitis is prolonged for more than six months, it is called as chronic hepatitis. Chronic hepatitis is serious and may lead to serious damage to the liver. The causes for chronic hepatitis can be autoimmune, viral, metabolic disorders and drugs or toxin. Clinical symptoms of chronic hepatitis are non-specific and are mild.

Common symptoms include fatigue, sleep disorders, mild right upper quadrant pain, jaundice, muscle wasting, tea coloured urine, ascites, and hepatic encephalopathy.

Jaundice in Liver Diseases!

Jaundice is the yellow discolouration of the skin, mucous membranes and sclera. Jaundice occurs due to accumulation of bile pigments in the blood. If the liver is infected or diseased or the flow of bile is obstructed, then it gets accumulated in the blood resulting in jaundice.

Jaundice can be of three types:

- **Haemolytic Jaundice or Pre- hepatic Jaundice:** Increased unconjugated plasma bilirubin
- **Hepatic Jaundice:** Liver cells are damaged
- **Obstructive or Post – hepatic Jaundice:** Obstruction in the flow of bile into duodenum due to stones or cancer

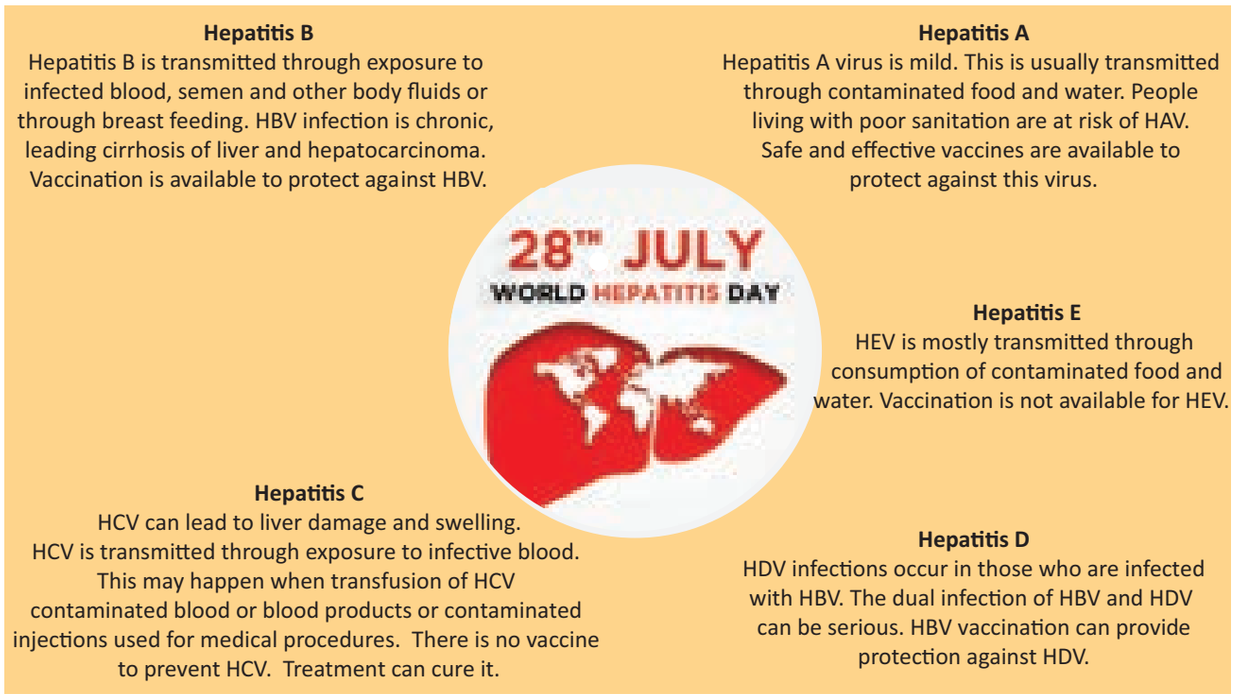


Fig 8.4 HEPATITIS VIRUSES

Goals for dietary treatment

- To provide adequate nutrition to the patient
- To avoid malnutrition
- To relieve symptoms of the disease
- To support the regeneration of liver tissues
- To prevent progression of the disease

Dietary Principle

A diet which has adequate calorie, high protein, high carbohydrate, low fat, adequate fibre and adequate fluid diet is prescribed for the patient. Small frequent meals are better tolerated than three large meals.

Diet therapy for Hepatitis

Energy

Energy intake can be increased gradually based on the tolerance of the patient. At initial stage, patient may not be able to eat enough due to anorexia. Gradually the energy intake can be increased to 1600-2000 kcal per day. This is to prevent endogenous breakdown of protein.

Protein

High protein diet promotes regeneration of the liver. Around 1.5g to 2g per kg body weight is recommended. Good quality protein is preferred for the patient. If the patient has jaundice, 40-60 grams of protein can be given. In case of hepatic coma, protein intake should be withheld till condition improves.

Fat

Fat digestion and absorption is impaired in hepatitis. Low fat diet is preferred for the patient with hepatitis. Easily digested fats like medium chain triglycerides or emulsified fats such as milk, butter, cream, eggs should be given. For a patient with jaundice, 20-30 grams of fat per day can be given.

Activity : 6

Match the causes for the Hepatitis!

Viral hepatitis	-	Autoimmune
Alcoholic Hepatitis	-	Hepatitis virus
Chronic Hepatitis	-	Alcohol

Carbohydrate

A high carbohydrate diet is recommended to supply enough calories and spare protein for tissue regeneration. High carbohydrate foods like sugar, jaggery and fruit juices can be given. A requirement of 300-400 grams per day can be given for the patient.

Vitamins and Minerals

The requirement of Vitamin B, C and K are increased. It should be met through supplementation or through diet. The diet should be provided with minerals such as calcium and iron in adequate amounts. Serum sodium and potassium levels are monitored and electrolyte balance should be maintained.

Foods to be included and avoided for Hepatitis

Foods to be included	Foods to be avoided
Sugar, honey, Glucose	Fried and fatty foods.
Cereals, Pulses	Fats, Oils
Milk and milk products, Eggs	Nuts and Oilseeds
Fruits and vegetables	Strongly flavoured vegetables

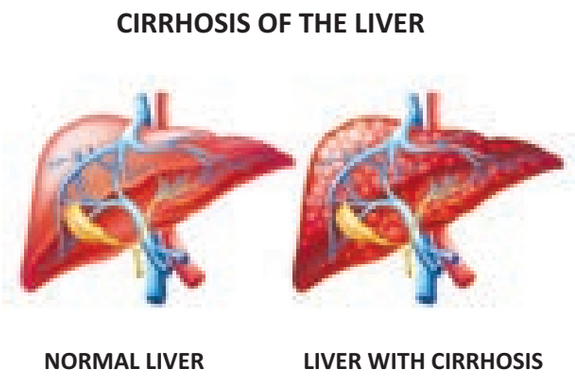


Fig 8.5 : Cirrhosis of the Liver

HOME REMEDIES

FOR JAUNDICE

- Sunlight is used in the treatment of neonatal jaundice.
- Prepare juice of the green leaves of radish and mix some sugar. Filtrate can be taken 2 times a day for a week.
- Mix one teaspoon of aloe vera pulp with black salt and dry ginger powder. This is taken for 10 days every morning.
- Take clean leaves of keezhanelli (without stem) and the seeds below the leaves (very small). Put it in the blender with some water to make an extract. Add buttermilk to the keezhanelli extract. Add crushed black pepper on it. Drink it everyday

8.2.2 CIRRHOSIS

Liver cirrhosis is a degenerative disease characterized by inflamed liver cells, abnormal fibrosis and development of nodules leading to obstruction and liver failure.

The etiology of liver cirrhosis is:

- Neglected acute or chronic hepatitis
- Alcoholism associated with malnutrition
- Viral infection
- Toxins
- Metabolic disorders
- Biliary obstruction
- Altered immune system

The symptoms of liver cirrhosis include:

- GI disturbances (anorexia, nausea, vomiting and abdominal pain)
- Electrolyte and fluid imbalance
- Ascites (accumulation of water in abdominal cavity)

- Severe jaundice (yellow colouration of eyes and skin)
- Chronic inflammation of the liver
- Fibrosis and fatty infiltration of the liver
- Weight loss and muscle wasting
- Necrosis (death of cells)

STAGES OF CIRRHOSIS!

The pathogenesis of alcoholic liver disease progresses in three stages.

Stage 1: Hepatic Steatosis or Fatty Liver: During this stage, the fat infiltrates in to functioning liver cells and causes problems in normal functioning of liver. This stage is reversible if alcohol abuse is stopped.

Stage 2: Alcoholic Hepatitis: This is characterized by enlargement of liver. If alcohol intake is discontinued, hepatitis may resolve or it progresses to cirrhosis.

Stage 3: Alcoholic Cirrhosis: Patient develops further complications of ascites, gastrointestinal bleeding, portal hypertension and hepatic encephalopathy in this stage.

Goals for dietary treatment

- To maintain adequate nutrition
- To prevent breakdown of body protein tissue
- To control ascites
- To prevent progression of the disease
- To prevent the symptoms of hepatic encephalopathy

Dietary principle

A high calorie, high carbohydrate, adequate protein and low fat, low fluid and restricted sodium (in case of ascites), adequate fibre and high vitamins and minerals diet is prescribed for the patients with liver cirrhosis.

Diet therapy for cirrhosis

Energy

Approximately 35-40 kcal/ kg body weight is recommended. Energy intake of 2000 to 3000 kcal per day is given to maintain adequate nutrition and to prevent protein breakdown.

Protein

Protein intake should be adjusted as per the individual requirement. A protein intake of 1g/ kg body weight per day is given to achieve positive nitrogen balance. In case of hepatic coma, protein requirement is reduced to 0.5g/ kg bodyweight per day.

Fat

Steatorrhoea or fatty infiltration of liver may be seen in cirrhosis patient. A low intake of fat in the form of medium chain triglyceride (eg Coconut oil) may prove to be effective in reducing the malabsorption of fat.

Carbohydrate

High carbohydrate (300-400g/day) may be given for its protein sparing effect. This protects and supports liver function. Carbohydrate intake also helps in maintaining the weight of the patient.

MALNUTRITION IN CIRRHOSIS!

Malnutrition is common and predominant in liver diseases. The factors resulting in malnutrition are:

- Decreased food intake because of anorexia, nausea and vomiting, unpalatable diet and the drugs
- Impaired digestion and absorption of nutrients due to pancreatic insufficiency, bile salt deficiency and mucosal defect
- Increased energy requirement
- Insufficient protein synthesis
- Alcohol consumption

Vitamins and minerals

Supplementation of vitamins is needed to replenish liver stores and repair tissue damage. The important vitamins are pyridoxine, cyanocobalamin, folate, niacin and thiamine. Supplementation of minerals such as calcium, magnesium and zinc should be given in adequate doses. Restriction of sodium is essential if ascites is present. Sodium restriction up to 500mg per day is seen with ascites. Low sodium foods should be encouraged.

Fibre

Adequate fibre can be given for the patient. In severe cases of cirrhosis, low fibre diet is necessary.

Fluid

Restricted fluid is given if ascites is present. The fluid requirement is 1500ml per day. If the ascites is corrected, normal fluid intake may be emphasized.

Foods to be included and avoided for Cirrhosis

Foods to be included	Foods to be avoided
• Bread, rice, maize, jowar, breakfast cereals, pasta and refined cereals	• Fried and fatty foods.
• Tonned milk and milk products like paneer and curd	• Fats, Oils
• Split pulses and beans	• Nuts and Oilseeds
• Sugar, jaggery, honey, jam or jellies	• Strongly flavoured vegetables
• Lean meat, egg white, fish or chicken	
• Potato, sweet potato, yam	
• Beverages, fruit juices	

HEPATIC ENCEPHALOPATHY!

Hepatic encephalopathy is a damage of brain and nervous system that occurs as a complication of liver disorders. Hepatic encephalopathy is characterized by neurological disturbances, elevated ammonia levels (ammonia which is not converted to urea by liver), high blood concentration of aromatic amino acids and low levels of branched chain amino acids.

The symptoms of hepatic encephalopathy are mild confusion, euphoria or depression, decreased attention, irritability, disturbance in sleep patterns, lethargy, speech disorientation, and finally coma.

Restriction of dietary protein is the first step. The diet should be rich in calories, low protein (BCAA protein can be given) and restricted fluid. Electrolyte imbalance should be corrected and vitamin supplementation especially vitamin B and C may be given

SUMMARY

- The gastrointestinal tract is an active organ which digests and modifies the nutrients for absorption.
- Gastrointestinal diseases refer to diseases involving gastrointestinal tract that is esophagus, stomach, small intestine and large intestine and accessory organs of digestion.
- Diarrhoea is the condition when there is rapid transit of intestinal contents through the small intestine, reduced enzymatic digestion of foods and decreased absorption of nutrients. The therapy for diarrhoea consists of fluid and electrolyte management and dietary management.
- Constipation is defined as difficulty or infrequent passage of stools. There are three types of constipation. The primary nutrition therapy for constipation is including adequate amounts of dietary fibre, both soluble and insoluble and adequate amounts of fluids.
- Peptic ulcer is a term used to describe any localized erosion or necrosis of the mucosal lining that comes in contact with gastric juice. The key to the management of peptic ulcer is the judicious choice of drug therapy and dietary modifications.
- Hepatitis is an inflammation of liver. Hepatitis is classified as acute viral hepatitis and chronic hepatitis.
- Liver cirrhosis is a degenerative disease which is characterized by inflamed liver cells, abnormal fibrosis and development of nodules leading to obstruction and liver failure. One of the common symptoms of liver diseases is Jaundice.

A-Z GLOSSARY

Addison's disease	Addison's disease, also known as primary adrenal insufficiency and hypocortisolism, is a long-term endocrine disorder in which the adrenal glands do not produce enough steroid hormones.
Anal fissures	An anal fissure is a small, oval shaped tear in skin that lines the opening of the anus
Ascites	Accumulation of fluid in abdominal cavity
Atonic Constipation	Atonic constipation is the condition where bowel activity is reduced because of lack of normal muscle tone or strength in the colon
BCAA protein	Protein sources which are rich in branched chain amino acids (Leucine, Isoleucine and Valine)
Bland diet	A diet which contains mechanically, chemically and thermally non-irritating foods that are generally soft, well cooked, low in dietary fibre and not spicy.
Carcinoma	Carcinoma is the most common type of cancer. It begins in the epithelial tissue of the skin, or in the tissue that lines the internal organs, such as the liver or kidneys.

Celiac disease	Celiac disease is a serious digestive disorder caused by an abnormal immune reaction to gluten.
Epigastric pain	It is pain or discomfort right below the ribs or upper abdomen. It can be a sign of gastro intestinal disease
Fecal Oral Route	Diseases can be transmitted when the stool of one host ends up in other person's mouth.
Fatty liver	A condition characterized by the accumulation of fat in liver
Fulminant liver disease	Absence of preexisting liver disease but development of hepatic coma.
Hepatic coma	Coma that can occur in severe cases of liver diseases
Hepatic encephalopathy	Hepatic encephalopathy is a decline in brain function that occurs as a result of severe liver disease
Hepatomegaly	Enlargement of liver
Hepatic Ischemia	Hepatic ischemia is a condition in which the liver does not get enough oxygen or blood. This causes injury to liver cells.
Hemorrhoids	Hemorrhoids are swollen and inflamed veins in the rectum and anus that cause discomfort and bleeding.
Hematemesis	Blood vomit
Icterus	Increaed level of plasma bilirubin levels. Also called as Jaundice
Laxatives	Laxatives are substances or drugs that loosen stools and increase bowel movements. They are used to treat and prevent constipation.
Melena	Black tarry stools indicative gastrointestinal bleeding
Malabsorption syndrome	Malabsorption syndrome refers to a number of disorders in which the small intestine is unable to absorb certain nutrients such as carbohydrates, protein, fat and fluids.
Necrosis	Damage or death of tissues
Obstructive Constipation	It is the inability to pass stool through the digestive tract out the rectum because of any obstruction in the intestines.
Oral Rehydration Therapy	Oral Rehydration Therapy (ORT) is a type of fluid replacement used to prevent and treat dehydration, especially which is due to diarrhea.
Portal hypertension	High blood pressure in the portal vein which carries blood to the liver
Prebiotics	Non-digestible food that stimulates the growth of symbiotic bacteria present in the colon
Probiotics	Live microbial flora that can be used to reestablish the intestinal flora and improve the gut health

Prostaglandins	Prostaglandins are found in tissues and organs. They are synthesized in the cell from the essential fatty acids (EFAs). Prostaglandins are made at sites of tissue damage or infection, where they cause inflammation, pain and fever as part of the healing process
Reye's syndrome	Reye's syndrome is a rare but serious condition that causes swelling in the liver and brain.
Spastic Constipation	Constipation due to excessive tonicity of the large intestinal wall.
Steatorhoea	Presence of excess fat in the stool because of fat malabsorption
Wilson's disease	Wilson's disease is a rare inherited disorder that causes copper to accumulate in the liver, brain and other vital organs.

Evaluation

I. Choose the correct answer

1. Accumulation of fluid in the abdominal cavity is _____.
   a. Oedema b. Swelling
   c. Ascitis d. Dialysis
2. Jaundice is also called as _____.
   a.Hepatitis b. Icterus
   c. Cirrhosis d. Hemolysis
3 _____ is the common cause for alcoholic hepatitis.
   a.Virus b. Chemical
   c. Alcohol d. Food & Water
4 _____ replacement is the principle diet goal in diarrhoea.
   a.Calorie b. Fat
   c. Fluid d. Calcium
5. Frequent evacuation of watery stools is called as _____.
   a. Constipation b. Ulcers
   c. Colitis d. Diarrhoea

II. Short answers

1. What are the functions of gastrointestinal system?
2. List the different types of hepatitis virus
3. List the functions of liver
4. What is hepatitis?
5. Give examples for low fibre foods?
6. What is bland diet?

III. Brief answers

1. What are the types of constipation?
2. What are the causes of constipation?
3. Describe the causes for peptic ulcer?
4. Give the dietary principle for hepatitis
5. List five foods for high protein foods.
6. Differentiate gastric ulcer from duodenal ulcer

IV. Detailed answers

1. Differentiate the diet therapy of diarrhoea from constipation
2. What are the types of hepatitis?
3. What is Oral Rehydration Therapy?
4. What are the goals for treatment in peptic ulcer?
5. Explain in detail the diet therapy in cirrhosis.