
UNIT 2 DISORDERS OF LOWER GASTROINTESTINAL TRACT

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2.0 OBJECTIVES

After going through this unit, you should be able to:

- 1 discuss the importance of malabsorption syndromes in the elderly and manage the same;
- 1 diagnose tropical sprue and manage it;
- 1 recognise the causes of constipation and flatulence in elderly and manage the same; and
- 1 assess the treatable causes of faecal incontinence.

2.1 INTRODUCTION

In the previous unit, you have already learnt about the clinical signs, importance, diagnosis and proper management of upper gastrointestinal disorders. In this unit, you will learn about the clinical importance of early recognition and management of lower gastrointestinal disorders. These can cause complications and diagnostic difficulties if not detected in time. Malabsorption may have totally different causes in the elderly, though some causes are same as in the other age group. You will learn special handling of such disorders in the geriatric patient. Tropical sprue in the elderly has to be diagnosed and treated early. Constipation and flatulence in the elderly are of great clinical significance as these can cause a lot of distress and interfere with quality of life in the elderly. Early diagnosis and relief is therefore important to continue the relief for maintaining good quality of life.

The most distressing symptom of faecal incontinence requires a thorough knowledge of factors causing it. Early diagnosis and treatment are therefore very important for you to know.

2.2 MALABSORPTION DISORDERS IN ELDERLY

You already know that principal function of intestine is absorption of nutrients from ingested food after proper digestion and change into suitable form for transport to the intestinal epithelium. Defects in this results in malabsorption syndromes.

Malabsorption refers to a group of disorders caused by the defective absorption of ingested nutrients characterized by abdominal distension, malabsorption and steatorrhea, muscle wasting, and failure to thrive. Rarely a defect in absorption of a single nutrient may occur.

2.2.1 Aetiology

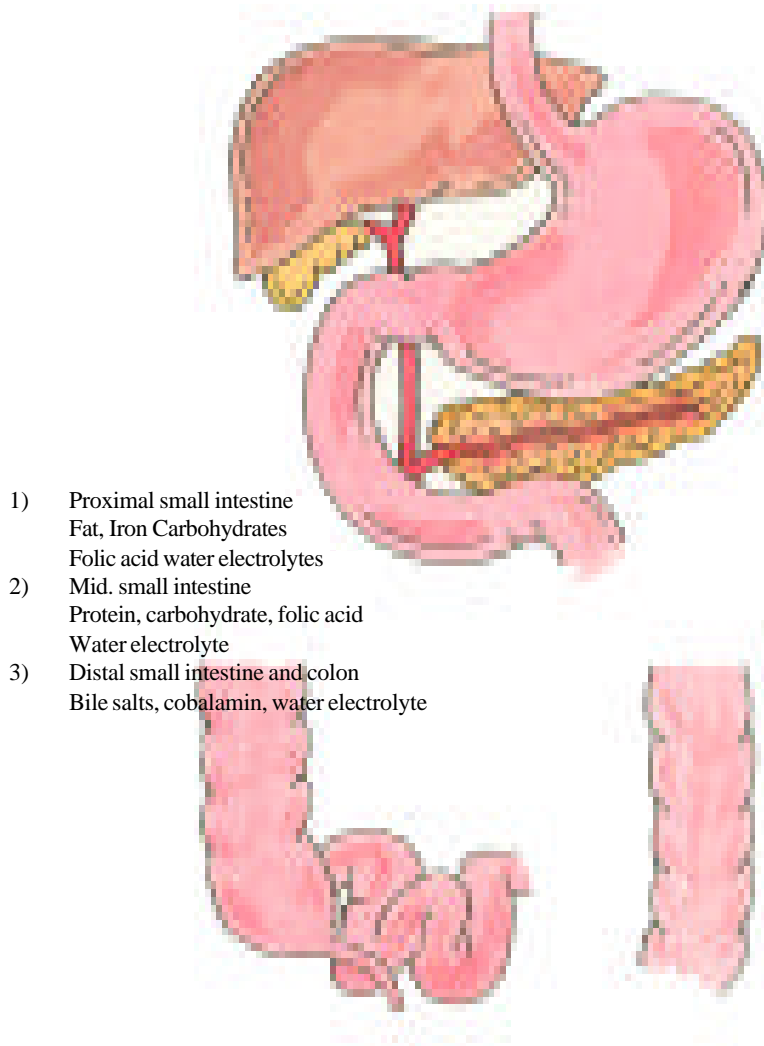
The exact incidence of malabsorption in India is not known. By far the commonest cause in India is tropical sprue, followed by tuberculosis, lymphoma of IPSID (immunoproliferative small intestinal disease) variety and giardiasis. The different causes are enumerated in the Table 2.1 below:

Table 2.1: Causes of Malabsorption Disorders in Elderly

I) Pancreohepatobiliary Disorders
a) Inadequate Intraluminal Digestion
1 Chronic Pancreatitis
1 Cystic Fibrosis
1 Shwachman's Syndrome
b) Inadequate bile excretion
1 Biliary Atresia
1 Cholestatic States
II) Intestinal Disorders
1) Inadequate Absorptive Surface
1 Short Bowel Syndrome
1 Stagnant Loop Syndrome
2) Mucosal Injury Disorders
1 Celiac Disease
1 Chronic Malnutrition
1 Chronic Persistent Diarrhoea
1 Immunodeficiency States
1 Immunoproliferative Small Intestinal Disease
1 Intractable Diarrhoea of Infancy
1 Postenteritis Syndrome
1 Tropical Sprue
1 Whipple's Disease
1 Wolman Disease
1 Giardiasis
III) Impaired Postenterocyte Event
1 Intestinal Lymphangiectasia

2.2.2 Pathogenesis

There is defective absorption of ingested fats, proteins, carbohydrates, and/or minerals which results in symptoms of deficiency. To understand the causes a study of site of absorption of different nutrients is needed. This is shown diagrammatically in Fig. 2.1.



- 1) Proximal small intestine
Fat, Iron Carbohydrates
Folic acid water electrolytes
- 2) Mid. small intestine
Protein, carbohydrate, folic acid
Water electrolyte
- 3) Distal small intestine and colon
Bile salts, cobalamin, water electrolyte

Fig. 2.1:

- A) Inadequate bile synthesis and delivery:
Diseases of Liver G.B., bile duct, Pancreas.
- B) Intestine:
Inadequate absorption surface
Mucosal injury e.g. Tropical sprue
Whipple's disease, Giardiasis.
- C) Impaired Post Enterocyte event:
Intestinal lymphangiectasis.

2.2.3 Clinical Picture

Clinical picture is highly variable. May present either with symptoms of underlying disease or with symptoms due to deficiency. Several characteristic symptoms and more often physical signs may provide valuable clues to the diagnosis of a primary disease. The commonly encountered symptoms are:

Steatorrhoea

Patient usually complain of passing loose, pale, bulky, greasy and offensive-smelling stools sticking to toilet pan-weighing more than 500 g stool daily passage of daily stool between 250 g and 500 g may occur with lesions of bowel.

Diarrhoea

High-volume, watery, floating stool diarrhoea is also common. It is suggestive of water and carbohydrate malabsorption. These should suggest either secretory or osmotic diarrhoea. Secretory diarrhoea in tropical areas is often due to infection.

Abdominal symptoms

Mild to moderate abdominal pain, usually of colicky type, abdominal discomfort, distension, flatulence and borborygmi are often present. Sometimes these symptoms may be related to meals or defaecation, invoking a mistaken diagnosis of gastroduodenal or colonic involvement. Patients with severe steatorrhoea may have hyperoxaluria and may form renal stones.

Nutritional deficiency

Chronic malabsorption may lead to usually multiple nutritional deficiencies. Weight loss despite good appetite is known. Protein deficiency also leads to weight loss, oedema and muscle wasting. Vitamin and mineral deficiencies may manifest as —

- a) Anaemia due to deficiency of iron, folate or vitamin B₁₂;
- b) Bleeding due to vitamin K deficiency;
- c) Bone disease, skeletal abnormalities and muscle signs like Chvostek or Trousseau sign due to calcium or vitamin D deficiency; night blindness and Bitot's spots due to vitamin A deficiency.
- d) Deficiency of various vitamins of the B complex may result in neuropathy, mucosal ulceration's, glossitis, skin pigmentation and pallor.

Non-specific features

Symptoms like anorexia, weight loss, lethargy, general irritability, anaemia and breathlessness may sometimes be the only manifestations. Some patients may present with hyperphagia and others with a combination of diarrhoea and hyperphagia. Clubbing of fingers is common. Chronic severe diarrhoea may lead to oedema and other signs of hypoproteinaemia, electrolyte imbalance and dehydration. Classical triad of weight loss, anaemia and diarrhoea is commonly seen. Patient may complain of pale, soft, bulky, malodorous stools.

Symptoms of malabsorption are variable and involve many organ systems. Table 2.2 shows the relationship between clinical picture and pathophysiology.

Table 2.2: Relationship between clinical picture and pathophysiology

Symptom	Sign	Pathophysiology
Diarrhoea	Dehydration	Impaired water and electrolyte absorption.
Greasy bulky offensive Stool Good appetite with weight loss Excessive flatus	Hypotension	Unabsorbed bile acids and fatty acids Excess fat in stool.
	Weight loss	Loss of calories Fermentation of carbohydrates by colonic bacteria
Diffuse abdominal pain Weakness and fatigue	Pallor, anaemia	Inflammation Protein, fat, electrolyte, iron, folate malabsorption
	glossitis stomatitis	
Easy bruisability Bone pain	Ecchymosis purpuri	Vitamin K Malabsorption Calcium + Protein Malabsorption
Swellings	Oedema	Protein Malabsorption
Neuritic pains	Peripheral neuropathy	Deficiency of cobalamin
2.2.4 Investigation		

Most important for diagnosis is to establish presence of steatorrhoea. For this quantitative chemical analysis of fat in 72 hour stool collection is determined when patient is fed on atleast 100 gms fat per day. Normal subject excrete less than 7 grams of fat per day. With this test, it will indicate that patient has malabsorption syndrome. After routine haematological investigations showing low values of Calcium Magnesium, iron, folate etc., specific tests may be undertaken. The specific diagnosis is then established with other investigations done in laboratories with adequate facilities.

- 1) **Qualitative stool:** Fat test is done in pancreatic insufficiency by detecting undigested triglyceride. In small bowel disease, this is done to detect free fatty acids.
- 2) **Urinary and Xylose test:** This is done to distinguish between malabsorption due to small intestinal disease and that due to pancreatic exocrine insufficiency.
- 3) **Bentizomide Urinary Excretion test** is for diagnosis of pancreatic insufficiency.
- 4) **Serum:** Trypsin like Immuno reactivity done for pancreatic insufficiency.
- 5) **Secretin Test** is for direct measurement of exocrine function of pancreas.
- 6) **Tests for Cobalamin Absorption- Schilling test:** There are two breath tests available in some laboratories to detect lactose deficiency and to diagnose bacterial overgrowth.

These are :

Lactose² H breath test

14-C Xylose Breath test.

- 7) **Culture:** Small intestinal fluid culture is done in some places.
- 8) **Biopsy of small intestine** is useful in evaluating whipple's disease, tropical sprue and ileojejunitis.
- 9) **Radiological Investigations** are not very important in diagnosis of malabsorption.

2.2.5 Management

The management of malabsorption depends upon establishing the cause of malabsorption.

- 1) Eliminate offending substances e.g., lactose in some cases
- 2) Treat the infection
- 3) Institute symptomatic and nutritional support.

In some cases bile salts e.g. cholestyramine 4 gms TDS before meals is helpful. To treat hyper oxaluria avoid spinach, beet, peanuts, beans, carrots, onions, grapes, chocolates, tea, coffee, and cola.

Check Your Progress 1

- 1) **What is malabsorption syndrome? Enumerate its salient clinical symptoms.**

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2) What is the common cause of malabsorption syndrome in India?

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2.3 TROPICAL SPRUE

Tropical sprue is defined as a primary malabsorption syndrome, presenting clinically with chronic diarrhoea and signs of nutritional deficiency. It was affecting visitors to or residents of tropical regions. Both epidemic and endemic forms of the disease have been recognized. Aetiology is not well established. Detailed investigations may show in many patients nutritional deficiency, infectious micro-organism, parasitic infection. When all such conditions are excluded, a group of patients without definable underlying cause would remain, who if they are resident in or have been visitors to tropical countries would be diagnosed as having tropical sprue.

Epidemiology

In southern India, tropical sprue is encountered in two epidemiologically distinct forms:

- i) Endemic tropical sprue is diagnosed in patients who present without temporal or spatial association with other similar patients;
- ii) Other patients develop the syndrome in large epidemics of diarrhoea, the largest of which affected at least 100,000 people with nearly 50,000 deaths. Overall, the attack rate in adults is significantly higher than in children.

Reports from different parts of the world including India have shown a decreased incidence of tropical sprue during the late 1980s and 1990s. This has been linked to possible improvement in the general nutritional status of the population and environmental hygiene.

Tropical sprue is more in females and in hot damp coastal climate mostly after monsoon. The aetiology of tropical sprue is not yet known. The basic lesion-cell damage (enterocyte damage), may be the result of infections, nutritional deficiency or toxins.

Pathophysiology

In the pathogenesis of the jejunal mucosal lesion in tropical sprue, the initial event is damage to enterocyte stem cells, which then produce damaged progeny which are rapidly extruded from the epithelial layer. The enterocyte stem cell lesion in the crypts has only been demonstrated in patients with tropical sprue in southern India. In Puerto Rican patients colonisation of the upper small intestinal lumen by toxin-producing coliforms appears to be causally related; their eradication with appropriate antibiotics cures the patient. However, significant bacterial colonisation has not been demonstrated in southern Indian patients.

The cause of diarrhoea in patients with tropical sprue is not only impaired water absorption or secretion in the small intestine, but also a defect in the function of the colon. A colonocyte lesion which resembles the small intestinal lesion also occurs in these patients. In addition, unabsorbed unsaturated fatty acids in the faeces have an inhibitory effect on sodium-potassium adenosine triphosphatase, the biochemical equivalent of the sodium pump, on the basolateral membranes of the colonocytes. This appears to be an important mechanism in the pathogenesis of diarrhoea in tropical sprue.

Clinical Features

The majority of patients present with a history of chronic diarrhoea of several months' duration and the nutritional sequelae of malabsorption.

Clinical features of nutritional deficiency (wasting, oedema, megaloblastic anaemia, thrombocytopenia, cutaneous and hair changes of hypoproteinaemia, xerosis of conjunctivae,

keratomalacia, etc.) are the major findings at the time of presentation. The prevalence of signs and symptoms of nutritional deficiency correlates well with the duration of illness, indicating that these are a result of malabsorption.

The stools in the chronic stage of the illness are often large in bulk, unformed, frothy and may float in the toilet. The volume of diarrhoea in the chronic stage is usually not sufficient to cause major problems of dehydration. In contrast, early in the course of the illness, especially in epidemics, watery diarrhoea and dehydration are widely prevalent and dehydration is a major cause of death.

Intercurrent infections are common in malnourished patients, and in the tropical environment cutaneous and respiratory infections are the most important, the latter often contributing to morbidity and mortality.

Diagnosis

The diagnosis is dependent on confirming malabsorption of nutrients and excluding the many conditions which can cause malabsorption by defined mechanisms. Usually the absorption of fat, D-xylose and vitamin B12 are the three tests which are widely used. Malabsorption of at least two nutrients is usually present. Once malabsorption has been established, detailed investigations to find the underlying cause, if any, are necessary. Small intestinal mucosal biopsy, careful search for intestinal parasites (giardia, strongyloides, etc.), estimation of immunoglobulins, pancreatic function studies and careful radiological examination in selected patients, may all be indicated to exclude other causes of malabsorption. The changes in the jejunal mucosa are only suggestive and not diagnostic. The major importance of jejunal biopsies is to exclude other causes of malabsorption. The acquired immuno deficiency syndrome (AIDS) can present with chronic wasting diarrhoea. Significant morphologic abnormalities are found in the small intestinal mucosa of patients with AIDS which may contribute to malabsorption. The higher prevalence of enteric infections, especially with parasites such as cryptosporidium, is also a contributing factor to chronic diarrhoea in human immuno deficiency virus infection.

An important part of the diagnostic work-up is the evaluation of the nutritional status of the patient. Haematological parameters, serum proteins and a variety of vitamins (vitamin B12 folate, vitamin A, etc.) can be assessed and in all groups of patients a high prevalence of nutritional deficiency has been documented. The nutritional assessment contributes to the management of the patient.

Management and Prognosis

Control of diarrhoea and correction of the nutritional deficiencies is the basis of the management of these patients. In patients with diarrhoea, sufficient to cause dehydration, oral maintenance of hydration with the glucose-electrolyte solution has a definite role. In other patients with chronic diarrhoea symptomatic measures can give considerable relief. Nutritional deficiencies must be corrected by specific supplementation. It is necessary to give a diet which the patient can consume and which will also provide adequate calories to correct deficits which may have built up over several months. A satisfactory weight gain by the patient is a good index of the adequacy of the measures.

Antibiotics: Broad-spectrum antibiotics and folic acid have been suggested as specific therapeutic measures to cure the intestinal lesion of tropical sprue. However, in southern India, in the indigenous populations, this therapy was not as efficacious, with response in only about 50% of the patients. There is also a high rate of spontaneous remission, which makes the evaluation of specific therapy difficult.

Check Your Progress 2

- 1) Which are the common tests widely used in the diagnosis of Tropical Sprue?

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2) Name the specific therapeutic measures in the treatment of tropical sprue.

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2.4 CONSTIPATION

Constipation is a symptom, not a disease. Like fever, constipation can be caused by many different conditions. Most people have experienced an occasional brief bout of constipation that has corrected itself with diet and time.

What is it?

Constipation is the infrequent and difficult passage of hard stools. It is defined as passage of hard stools at too long intervals (insufficient frequency). The hard stools are difficult to pass.

- 1 The frequency of bowel movements among healthy people varies greatly, ranging from three movements a day to three a week.
- 1 As a rule, if more than 3 days pass without a bowel movement, the intestinal contents may harden, and a person may have difficulty or even pain during elimination.
- 1 Stool may harden and be painful to pass, however, even after shorter intervals between bowel movements.

It is surprising to note that is one of the most common complaint in elderly—next to pain. Over-the-counter (OTC) sales of laxatives generate \$ 400 million annually in the United States. Indian figures are not available to us, but approximately 30% of healthy elderly people use laxatives regularly, the elderly contribute substantially to this \$ 400 million market. Indeed, laxatives are second only to analgesics as the OTC medications most widely used by the elderly. According to Harari et. al (Harvard Medical School Division on Aging), many of these people do not regard themselves as constipated, but simply in need of a regular purgative. Many of those people who do regard themselves as constipated do not have true constipation (defined as fewer than three bowel movements a week, straining at- stool, or both).

Old people may not be more prone to constipation but it is a symptom which they consider important. It is a belief amongst them that if bowel action is not regular there is a likelihood of autointoxication from stasis in colon and can give rise to symptoms like headache, fatigue, depression, coated tongue, offensive breath, etc. There is no definite knowledge of normal limits of colonic function, cultural habits and myths, therefore encouraged use of laxatives from misconceptions. Normal limits vary from 3 defecation per day to 3 defecation per week. Normal stoolweight is not directly related to the amount of ingested food or digestive secretion. Evacuation of bowel occurs even in the starving subject. Quality of diet e.g., high fibre has influence on bowel movements when stools are very hard , they may be impacted in rectum and descending colon. Liquid stools above impaction may give false notion of daily motion or diarrhoea.

2.4.1 Aetiology

Following table shows the aetiology of constipation:

Table 2.2: Aetiology of Constipation

Aetiology
Lesions of Gut
1 Any lesion of ganglion affects motility.
1 Obstruction to flow i.e. Tumour.
1 Idiopathic megacolon causing stasis, exact cause unknown. It is exceptional enlargement of sigmoid colon in elderly showing a giant loop on plain X-ray. There is gas and faecal mass. Cause may be intramural plexus damage probably by laxatives.
1 Spastic colon - diverticulosis.
Neurological disorders
1 Paraplegia
1 Multiple sclerosis
1 Parkinson's disease
Metabolic Disturbance
1 Hypercalcemia
1 Porphyruria
Drugs
1 Narcotic analgesics
1 Aluminium containing antacids
1 Antidepressants — Tranquilizers
1 Anticonvulsants
1 Antispasmodics
1 Iron supplements
Endocrine disorders
1 Hypothyroidism
Psychiatric Disorders
1 Depression
Mechanical Compression
1 Incisional ventral hernia after abdominal operation.
1 Malignancy
General
1 Immobility
1 Improper diet rich in meat, eggs, deserts. Poor in vegetables, whole grain bran.
1 Improper bowel training.
1 Laxative abuse. Increasing dosages fail to work.
1 Prolonged sitting on long distance travel with added diet changes and taking less water.

2.4.2 Complications

Faecal Impaction: It is serious and often not recognised. The water absorption leaves the stool very very hard and the resultant irritation to mucosa leaves to mucoid excreta. The following can occur.

- 1 Faecal incontinence
- 1 False diarrhoea
- 1 Mechanical ileus (un-necessary surgery can be performed)
- 1 Severe confusional states: due to rectocephalic reflex.
- 1 Urinary retention- pressure of overfilled rectum on bladder neck.
- 1 Bleeding Anal fissures — piles

Avoid sedatives till evacuation if the elderly is in severe confusional state.

2.4.3 Diagnosis

Constipation may be caused by abnormalities or obstructions of the digestive system in some people. A doctor can perform following tests to determine if constipation is the symptom of an underlying disorder.

- 1) **Routine blood, urine, and stool tests**
- 2) **Sigmoidoscopy:** Sigmoidoscopy is a procedure which can be done in the clinic. **Sigmoidoscope** is a flexible, lighted instrument which can be inserted through the anus to examine the rectum and lower intestine.
- 3) **Colonoscopy:** Colonoscopy can be performed to inspect the entire colon. A colonoscope is an instrument similar to the sigmoidoscope, but longer and able to follow the twists and turns of the entire large intestine.
- 4) **Barium enema x-ray:** This will provide similar information. If bleeding is present, a double-contrast barium enema is preferred. Other highly specialized techniques are available for measuring pressures and movements within the colon and its sphincter muscles, but these are used only in unusual cases.

2.4.4 Management

The most important strategy is to correct the underlying defect.

- 1 The first step in treating constipation is to understand that normal frequency which varies widely, from three bowel movements a day to three a week. Each person must determine what is normal to avoid becoming dependent on laxatives.
- 1 For most people, dietary and lifestyle improvements can lessen the chances of constipation.
- 1 A well-balanced diet that includes fiber-rich foods, such as unprocessed bran, whole-grain breads, and fresh fruits and vegetables, is recommended.
- 1 Drinking plenty of fluids and exercising regularly will help to stimulate intestinal activity. Special exercises may be necessary to tone up abdominal muscles after pregnancy or whenever abdominal muscles are lax.
- 1 Bowel habits also are important. Sufficient time should be set aside to allow for undisturbed visits to the bathroom. In addition, the urge to have a bowel movement should not be ignored.
- 1 If an underlying disorder is causing constipation, treatment will be directed toward the specific cause. For example, if an underactive thyroid is causing constipation, the doctor may prescribe thyroid hormone replacement therapy.
- 1 In most cases, laxatives should be the last resort and taken only under a doctor's supervision. A doctor is best qualified to determine when a laxative is needed and which type is best.
- 1 There are various types of oral laxatives, and they work in different ways.
- 1 Above all, it is necessary to recognize that a successful treatment program requires persistent effort and time. Constipation does not occur overnight, and it is not reasonable to expect that constipation can be relieved overnight.

Oral Laxatives

- 1 Bulk-forming laxatives are generally considered the safest laxative form but can interfere with the absorption of some drugs. These laxatives, which should be taken with 8 ounces of water, absorb water in the intestine and make the stool softer.
- 1 Bulk laxatives include:
 - psyllium (Metamucil)
 - methylcellulose (Citrucel)
 - calcium polycarbophil (FiberCon)
 - bran (in food and supplements).

Stimulants

- 1 Stimulants cause rhythmic muscular contractions in the small or large intestine.
- 1 These agents can lead to dependency and can damage the bowel with prolonged daily use.

These products include:

- 1 phenolphtha-lein (Correctol, Ex-Lax)
- 1 bisacodyl (Dulcolax)
- 1 castor oil (Purge, Neoloid)
- 1 senna (Senokot, Fletcher’s Castoria)

Stool Softeners/ Wetting Agents

- 1 Provide moisture to the stool and prevent excessive dehydration.
- 1 These laxatives often are recommended after childbirth or surgery.
- 1 Products include those with docusate (Colace, Dialose, and Surfak).

Lubricants

- 1 Lubricants grease the stool and make it slip through the intestine more easily.
- 1 Mineral oil is the most commonly used lubricant.

Osmotics

- 1 Osmotics are salts or carbohydrates that cause water to remain in the intestine for easier movement of stool.
- 1 Laxatives in this group include:
 - 1 milk of magnesia
 - 1 citrate of magnesia
 - 1 lactulose
 - 1 Epsom.

These lead to electrolyte disturbance.

Check Your Progress 3

1) What is constipation?

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2) What are the complications encountered with faecal impaction.

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2.5 LET US SUM UP

Malabsorption refers to a group of disorders caused by the defective absorption of ingested nutrients and characterised by abdominal disintention, malabsorption, steatorrhoe and muscle

wasting. By far the commonest cause in India is tropical sprue followed by tuberculosis, lymphoma of small intestine and giardiasis. Tropical sprue is more common in females and its aetiology is still not known. The diagnosis is made by estimation of fat absorption, D-Xylose test and Vitamin B12 level in the blood. Control of diarrhoea and correction of nutritional deficiencies is the corner stone of the therapy. Broad spectrum antibiotics and folic acid have been used as specific treatment modalities to cure the intestinal defect of tropical sprue.

The frequency of bowel movements vary from three movements a day to three a week. As a rule, constipation should be suspected if more than 3 days pass between bowel movements or if there is difficulty or pain when passing a hardened stool. Prevention is the best approach and following guidelines will help in preventing constipation:

- 1) Eat a well-balanced diet that includes unprocessed bran, whole wheat grains, fresh fruits and vegetables.
- 2) Drink plenty of fluids
- 3) Exercise regularly
- 4) Whenever there is a significant or prolonged change in bowel habits, consultation to be made without treating or fairly physician.

2.6 KEY WORDS

Chvostek or Trousseau Sign : Manifestation of spasm of carpedal muscle due to deficiency of calcium.

Malabsorption Syndrome : Group of disorders caused by defective absorption of ingested particle (food).

Steatorrhoea : Passage of loose, pale, bulky, greasy an offensive smelling stools stick to toilet pan?

2.7 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

- 1) Malabsorption refers to a group of disorders caused by the defective absorption of ingested nutrients, characterised by abdominal distention, chronic diarrhoea and muscle wasting.
- 2) The commonest cause of malabsorption syndrome in India is Tropical sprue.

Check Your Progress 2

- 1) Absorption of fat, D-xylose and vitamin B12 are the three tests commonly used to confirm the diagnosis of tropical sprue.
- 2) Broad spectrum antibiotics and folic acid have been suggested as specific measures in one treatment of tropical sprue.

Check Your Progress 3

- 1) Constipation is characterised by infrequent and difficult passage of hard stools. Persons passes hard stools at too long intervals.
- 2) The complications include faecal incontinence, false diarrhoea and mechanical ileus.

2.8 FURTHER READING

Sainani, G.S., *A.P.I. Textbook of Medicine*, 6th ed., Association of Physicians of India, 1999.