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## Malabsorption Syndrome.

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### ABSTRACT

Malabsorption is a state arising from abnormality in absorption of food nutrients across the gastrointestinal (GI) tract. Impairment can be of single or multiple nutrients depending on the abnormality. This may lead to malnutrition and a variety of anaemias. Depending on the nature of the disease process causing malabsorption and its extent, gastrointestinal symptoms may range from severe to subtle or may even be totally absent. Substantial numbers of patients with intestinal malabsorption present initially with symptoms or laboratory abnormalities that point to other organ systems in the absence of or overshadowing symptoms referable to the gastrointestinal tract. Malabsorption constitutes the pathological interference with the normal physiological sequence of digestion, absorption and transport (postmucosal events) of nutrients. Replacement of nutrients, electrolytes and fluid may be necessary. In severe deficiency, hospital admission may be required for nutritional support and detailed advice from dietitians.

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## INTRODUCTION

Malabsorption is one of the symptoms that people of all ages suffer from when left untreated may manifest with gastrointestinal symptoms.

### Definition

Malabsorption is a state arising from abnormality in absorption of food nutrients across the gastrointestinal (GI) tract. Impairment can be of single or multiple nutrients depending on the abnormality. This may lead to malnutrition and a variety of anaemias.

### Signs and symptoms

#### Gastrointestinal manifestations

Depending on the nature of the disease process causing malabsorption and its extent, gastrointestinal symptoms may range from severe to subtle or may even be totally absent. Diarrhea, weight loss, flatulence, abdominal bloating, abdominal cramps, and pain may be present.

#### Extraintestinal manifestations

Substantial numbers of patients with intestinal malabsorption present initially with symptoms or laboratory abnormalities that point to other organ systems in the absence of or overshadowing symptoms referable to the gastrointestinal tract. Weight loss can be significant despite increased oral intake of nutrients.

- Growth retardation, failure to thrive, delayed puberty in children
- Swelling or oedema from loss of protein
- Anaemias, commonly from vitamin B<sub>12</sub>, folic acid and iron deficiency presenting as fatigue and weakness.
- Muscle cramp from decreased vitamin D, calcium absorption. Also lead to osteomalacia and osteoporosis
- Bleeding tendencies from vitamin K and other coagulation factor deficiencies.

### Causes

#### Due to infective agents

- HIV related malabsorption
- Intestinal tuberculosis
- Parasites *e.g.*, diphyllobothrium (fish tape worm) (B<sub>12</sub> malabsorption), giardiasis (*Giardia lamblia*), hookworm (*Ancylostoma duodenale* roundworm, and *Necator americanus*)

#### Due to structural defects

- Blind loops
- Fistulae, diverticula and strictures
- Infiltrative conditions such as amyloidosis, lymphoma, eosinophilic gastroenteritis
- Inflammatory bowel diseases, as in Crohn's disease

#### Due to surgical structural changes

- Bariatric surgery (Weight loss surgery)
- Gastrectomy; Vagotomy

**Due to mucosal abnormality**

- Coeliac disease
- Cows' milk intolerance
- Fructose malabsorption
- Soya milk intolerance

**Due to enzyme deficiencies**

- Lactase deficiency inducing lactose intolerance (constitutional, secondary or rarely congenital)
- Intestinal disaccharidase deficiency
- Intestinal enteropeptidase deficiency
- Sucrose intolerance

**Due to digestive failure**

- Bile acid/Bile salt malabsorption
  - Bacterial overgrowth
  - Obstructive jaundice
  - Primary bile acid diarrhea
  - Terminal ileal disease such as Crohn's disease
- Pancreatic insufficiencies:
  - Carcinoma of pancreas
  - Chronic pancreatitis
  - Cystic fibrosis
- Zollinger-Ellison syndrome

**Due to other systemic diseases affecting GI tract**

- Abetalipoproteinaemia
- Addison's disease
- Carcinoid syndrome
- Coeliac disease
- Common variable immunodeficiency (CVID)
- Fiber Deficiency
- Hypothyroidism and hyperthyroidism
- Diabetes mellitus
- Hyperparathyroidism and Hypoparathyroidism
- Malnutrition

**Pathophysiology**

The main purpose of the gastrointestinal tract is to digest and absorb nutrients (fat, carbohydrate, protein, micronutrients (vitamins and trace minerals), water, and electrolytes). Digestion involves both mechanical and enzymatic breakdown of food. **Mechanical processes** include chewing, gastric churning, and the to-and-fro mixing in the small intestine. **Enzymatic hydrolysis** is initiated by intraluminal processes requiring gastric, pancreatic, and biliary secretions. The final products of digestion are absorbed through the intestinal epithelial cells. Malabsorption constitutes the pathological interference with the normal physiological sequence of digestion (intraluminal process), absorption (mucosal process) and transport (postmucosal events) of nutrients.

## Diagnosis

### Blood tests

- Routine blood tests may reveal anaemia, high CRP or low albumin; which shows a high correlation for the presence of an organic disease.<sup>[9][10]</sup> In this setting, microcytic anaemia usually implies iron deficiency and macrocytosis can be caused by impaired folic acid or B12 absorption or both. Low cholesterol or triglyceride may give a clue toward fat malabsorption.<sup>[11]</sup> Low calcium and phosphate may give a clue toward osteomalacia from low vitamin D.<sup>[11]</sup>
- Specific vitamins like vitamin D or micro nutrient like zinc levels can be checked. Fat soluble vitamins (A, D, E and K) are affected in fat malabsorption. Prolonged prothrombin time can be caused by vitamin K deficiency.
- Serological studies. Specific tests are carried out to determine the underlying cause.
- IgA Anti-transglutaminase antibodies or IgA Anti-endomysial antibodies for Coeliac disease (gluten sensitive enteropathy).

### Stool studies

- Microscopy is particularly useful in diarrhoea, may show protozoa like Giardia, ova, cyst and other infective agents.
- Fecal fat study to diagnose steatorrhoea is rarely performed nowadays.
- Low fecal pancreatic elastase is indicative of pancreatic insufficiency. Chymotrypsin and pancreolauryl can be assessed

### Radiological studies

- Barium follow through is useful in delineating small intestinal anatomy. Barium enema may be undertaken to see colonic or ileal lesions.
- CT abdomen is useful in ruling out structural abnormality, done in pancreatic protocol when visualising pancreas.
- Magnetic resonance cholangiopancreatography (MRCP) to complement or as an alternative to ERCP.

### Interventional studies

- OGD to detect duodenal pathology and obtain D2 biopsy (for coeliac disease, tropical sprue, Whipple's disease, abetalipoproteinaemia etc.)
- Enteroscopy for enteropathy and jejunal aspirate and culture for bacterial overgrowth
- Capsule Endoscopy is able to visualise the whole small intestine and is occasionally useful.
- Colonoscopy is necessary in colonic and ileal disease.
- ERCP will show pancreatic and biliary structural abnormalities

## Management

Treatment is directed largely towards management of underlying cause:

- Replacement of nutrients, electrolytes and fluid may be necessary. In severe deficiency, hospital admission may be required for nutritional support and detailed advice from dietitians. Use of enteral nutrition by naso-gastric or other feeding tubes may be able to provide sufficient nutritional supplementation. Tube placement may also be done by percutaneous endoscopic gastrostomy, or surgical jejunostomy. In patients whose intestinal absorptive surface is severely limited from disease or surgery, long term total parenteral nutrition may be needed.
- Pancreatic enzymes are supplemented orally in pancreatic insufficiency.
- Dietary modification is important in some conditions:
  - Gluten-free diet in coeliac disease.
  - Lactose avoidance in lactose intolerance.
- Antibiotic therapy to treat Small Bowel Bacterial overgrowth.



- Cholestyramine or other bile acid sequestrants will help reducing diarrhoea in bile acid malabsorption.

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