The absorptive process can be impaired at many stages. For example, patients with subtotal gastrectomy or bariatric surgery often experience malabsorption. There are resultant defects at all phases: impaired gastric churning, premature emptying, and impaired mixing (in the jejunum) of food with bile and pancreatic enzymes. The impaired mixing is a consequence of anatomic changes (gastrojejunostomy bypassing the duodenum) and reduced production of pancreatic enzymes (because cholecystokinin and secretin release is blunted when gastric contents bypass the duodenum). Moreover, stasis may lead to bacterial overgrowth in the afferent loop with changes in the bile acids needed for fat absorption. Another example of manifold mechanisms is diabetes mellitus, which may lead to delayed gastric emptying, abnormal intestinal motility, bacterial overgrowth, and pancreatic exocrine insufficiency.

CLINICAL PRESENTATION

The clinical manifestations of malabsorption are usually nonspecific, particularly in the early stages. A change in bowel movements, usually with diarrhea, and weight loss despite adequate food intake may occur in more severe cases. Usually, however, patients have relatively mild symptoms such as bloating and flatulence. Clinical manifestations related to a specific micronutrient deficiency can occur. For example, iron deficiency anemia may be the only manifestation of celiac disease in some patients. Muscle wasting and edema result from protein malabsorption. Nutritional anemia, caused by deficiencies of iron, folate, and vitamin B_{12}, contributes to fatigue. Bleeding tendency (e.g., ecchymosis) may be attributed to prolonged prothrombin time resulting from vitamin K deficiency related to fat malabsorption. Bulky, oily stools are the hallmark of steatorrhea resulting from fat malabsorption, whereas bloating (abdominal distention) and soft diarrheal movements occur as a result of carbohydrate malabsorption. Signs associated with malabsorption are presented in Table 33-4.

DIAGNOSIS

Malabsorption can be caused by a large number of disorders, and some of the more common of which are listed in Table 33-4. The cause of malabsorption can often be determined by a very detailed patient history. However, because the clinical symptoms are varied, more specific assays of albumin, cobalamin, iron, cholesterol, calcium, folic acid, and prothrombin time are useful to support the diagnosis of malabsorption. These tests are helpful in assessing the severity of malabsorption, but they are not specific for the differential diagnosis. Many tests are available in the work-up of malabsorption; those that have been most useful clinically are discussed in the following sections (Fig. 33-3).

Fecal Fat Analysis

If fat malabsorption is suspected, the simplest qualitative method for detecting fat in stool is microscopic examination with Sudan staining of a drop of stool. Sensitivity is limited, but the test is quick and easy, and it correlates well with the quantitative measurement of fecal fat when moderate to severe steatorrhea is present. To quantify fat, stool is collected for three consecutive days while the patient is on a diet containing 100 g of fat per day,

TABLE 33-4 SIGNS ASSOCIATED WITH MALABSORPTION SYNDROMES

SIGNS	ASSOCIATED SYNDROMES
GASTROINTESTINAL	
Mass	Crohn's disease, lymphoma, tuberculosis, glands
Distention	Intestinal obstruction, gas, ascites, pseudocyst (pancreatic), motility disorder
Steatorrheic stool	Mucosal disease, bacterial overgrowth, pancreatic insufficiency, infective or inflammatory, drug induced
EXTRAINTESTINAL	
Skin	
Nonspecific	Pigmentation, thinning, inelasticity, reduced subcutaneous fat
Specific	Blisters (dermatitis herpetiformis), erythema nodosum (Crohn's disease), petechiae (vitamin K deficiency), edema (hypoproteinemia)
Hair	
Alopecia	Gluten sensitivity
Loss or thinning	Generalized inanition, hypothyroidism, gluten sensitivity
Eyes	
Conjunctivitis, episcleritis	Crohn's disease, Behçet's syndrome
Paleness	Severe anemia
Mouth	
Aphthous ulcers	Crohn's disease, gluten sensitivity, Behçet's syndrome
Glossitis	Deficiencies of vitamin B_{12}, iron, folate, niacin
Angular cheilosis	Deficiencies of vitamin B_{12}, iron, folate, B complex
Dental hypoplasia (pitting, dystrophy)	Gluten sensitivity
Hands	
Raynaud's phenomenon	Scleroderma
Finger clubbing	Crohn's disease, lymphoma
Koilonychia	Iron deficiency
Leukonychia	Inanition
Musculoskeletal	
Monoarthropathy and polyarthropathy	Crohn's disease, gluten sensitivity, Whipple's disease, Behçet's syndrome
Back pain (osteomalacia, osteoporosis, sacroiliitis)	Crohn's disease, malnutrition, gluten sensitivity
Muscle weakness (low potassium, magnesium, vitamin D, generalized inanition)	Diffuse mucosal disease, bacterial overgrowth, lymphoma
Nervous System	
Peripheral neuropathy (weakness, paresthesias, numbness)	Vitamin B_{12} deficiency
Cerebral (seizures, dementia, intracerebral calcification, meningitis, pseudotumor, cranial nerve palsies)	Whipple's disease, gluten sensitivity, diffuse lymphoma

From Riley SA, Marsh MN: Maldigestion and malabsorption. In Feldman M, Scharschmidt BF, Sleisenger MH, editors: Sleisenger and Fordtran's gastrointestinal and liver disease: pathophysiology/diagnosis/management, ed 6, Philadelphia, 1998, WB Saunders, pp 1501–1522.