

TREATING EATING DISORDERS: A Quick Reference Guide

DOI: 10.1176/appi.books.9780890423370.146925

TABLE 2. Physical Complications of Eating Disorders

Organ System	Signs and Symptoms	Associated Laboratory Abnormalities
Whole body	Low body weight, dehydration, hypothermia, cachexia, weakness and lassitude increase with degree of malnutrition	<i>Weight:</i> Low weight and BMI
		<i>Anthropometrics:</i> Low body fat percentage by anthropometrics or underwater weighing ^a
Cardiovascular and peripheral vascular	Weakness; faintness; dizziness; orthostatic hypotension; shortness of breath; chest pain; palpitations; arrhythmias; bradycardia; weak irregular pulse; cold extremities; acrocyanosis	<i>ECG:</i> Bradycardia in AN; ST-T wave abnormalities in AN and with hypokalemia; increased PR interval and first-degree heartblock in AN; QTc prolongation ^b in AN and with hypokalemia; QT dispersion correlated with weight loss. In severe cases of BN, hypokalemia-widened QRS complex, increased P-wave amplitude, increased PR interval, increased supraventricular and ventricular ectopic rhythms; torsade de pointes correlated with hypokalemia; autonomic dysfunction on spectral analysis
		<i>Echocardiogram:</i> Mitral valve prolapse and pericardial effusion in AN; cardiomyopathy in ipecac abusers
		<i>Chest X-ray:</i> Small heart
Central nervous system	Apathy; poor concentration; in AN and severe cases of BN cognitive impairment; anxious, depressed, irritable mood and, less often, seizures, peripheral neuropathy	<i>CT scan:</i> Cortical atrophy, ventricular enlargement
		<i>PET, fMRI:</i> Abnormal cerebral blood flow and metabolism
		<i>MRI:</i> Decreased gray and white matter
Endocrine, metabolic	Fatigue, diuresis, cold intolerance and low body temperature in AN; weight fluctuation, poor skin turgor and pitting edema in BN; rarely, proximal weakness, irritability, muscle cramping, Chvostekâs and Trousseauâs signs	<i>EEG:</i> Nonspecific abnormalities; seizures (rare)
		<i>Complete metabolic panel:</i> Electrolyte abnormalities, including hypokalemia (with hypokalemic hypochloremic alkalosis in vomiters); hypomagnesemia (in vomiters, laxative abusers, and AN); hypophosphatemia (in vomiters and laxative abusers and especially on refeeding in AN); hypercholesterolemia in AN; hypoglycemia (rare)
		<i>Urinalysis:</i> Dehydration (increased urine specific gravity, osmolality) with purging or diuretic use
		<i>Thyroid testing:</i> Decreased T ₃ with increase in reverse T ₃ in AN
Gastrointestinal	<ul style="list-style-type: none"> • In AN, abdominal pain, bloating, obstipation, constipation, vomiting, abdominal distension with meals, abnormal bowel sounds; acute gastric distension (rare) • In vomiters, benign parotid hyperplasia, caries, gingivitis, occasional blood-streaked vomitus; possibly gastritis, esophagitis, gastroesophageal erosions, heartburn, esophageal dysmotility patterns (including gastroesophageal reflux) and, rarely, Mallory-Weiss (esophageal) or gastric tears, perforation, or necrosis; increased rates of pancreatitis; abdominal pain and discomfort; involuntary vomiting, obstipation, 	<i>Serum cortisol:</i> Increased serum cortisol in AN
		<i>Vitamin assays:</i> In severe cases, folate, B ₁₂ , niacin, and thiamine deficiencies in AN
		<i>Liver function tests:</i> Occasionally abnormal liver function test results
		<i>Serum amylase:</i> Increased serum amylase in purging patients (if fractionation is available, usually salivary gland isoenzymes); increased pancreatic amylase (rare), possibly indicating laxative abuse or other causes for pancreatic inflammation or pancreatitis
Gastrointestinal		<i>Gastric motility testing:</i> In AN, delayed gastric emptying, increased whole bowel and colonic transit time, anorectal dysfunction
		<i>Endoscopy:</i> Occasional inflammation or Barrettâs

	<ul style="list-style-type: none"> constipation In chronic laxative abusers, possibly bloating, colonic dysmotility or melanosis coli In patients with vitamin deficiencies, angular stomatitis, glossitis, diarrhea 	<p>esophagus</p> <p><i>Radiography:</i> Rarely, superior mesenteric artery syndrome, pancreatitis</p> <p><i>Stool for guaiac:</i> Occasionally positive because of purging or laxative abuse</p>
Genitourinary	In AN, decreased or increased urinary volume ^c	<p><i>Renal function tests:</i> In AN, increased blood urea nitrogen, decreased glomerular filtration rate, decreased serum creatinine because of low lean body mass (normal creatinine may indicate azotemia), renal failure (rare)</p> <p><i>Other renal findings:</i> In AN, greater formation of renal calculi, hypovolemic nephropathy, hypokalemic nephropathy</p>
Hematologic	In AN, fatigue, cold intolerance, bruising/clotting abnormalities (rare)	<p><i>Complete blood count:</i> In AN, anemia (may be normocytic, microcytic, or macrocytic); leukopenia with relative lymphocytosis; low erythrocyte sedimentation rate; thrombocytopenia; clotting factor abnormalities (rare)</p> <p><i>Other hematologic abnormalities:</i> In AN, decreased serum ferritin, B₁₂, folate</p>
Immune system	Fewer than expected viral infections in AN but may develop viral infections during weight restoration, reduced febrile response to bacterial infection	Multiple unexplained immune system abnormalities; abnormalities in tumor necrosis factor α and interleukin subtypes
Integument	<ul style="list-style-type: none"> In AN, change in hair, including lanugo; hair loss and dry and brittle hair; self-injury marks; numerous integumentary abnormalities, including xerosis, carotenoderma (yellowing of skin), and acne In vomiters, scarring on dorsum of hand (Russell's sign); petechia; conjunctival hemorrhages shortly after vomiting 	<i>Vitamin assays:</i> In AN, increased serum carotene; in severe cases, vitamin deficiencies (e.g., niacin)
Muscular	With severe malnutrition or ipecac-associated peripheral myopathy, muscle weakness, muscle aches, cramps; in severe cases, muscle wasting	<i>Enzyme tests:</i> With severe malnutrition, creatine kinase and other muscle enzyme abnormalities; creatine kinase isoenzymes for skeletal vs. cardiac source
Oropharyngeal	In vomiters, dental caries with erosion of dental enamel, particularly the lingual surface of incisors; pain and erythema of pharynx; palatal scratches; swollen cheeks and neck (usually painless); enlarged salivary glands	<p><i>Radiography:</i> Erosion of dental enamel</p> <p><i>Serum amylase:</i> Increased serum amylase associated with benign parotid hyperplasia</p>
Pulmonary	With severe malnutrition, reduced aerobic capacity and wasting of respiratory muscles	<i>Pulmonary function tests:</i> With severe malnutrition, decreased pulmonary capacity
Reproductive	<ul style="list-style-type: none"> In AN, loss of menses or primary amenorrhea; arrested sexual development or regression of secondary sex characteristics and psychosexual maturation or interest; loss of libido, fertility problems; higher rates of pregnancy complications and neonatal complications. Deficiencies in the mother can result in deficiencies in the fetus. In BN, fertility problems and oligomenorrhea or amenorrhea 	<p><i>Serum gonadotropins:</i> Decreased serum estrogen in female patients with AN or BN; decreased serum testosterone in male patients; prepubertal patterns of luteinizing hormone, follicle-stimulating hormone secretion with amenorrhea</p> <p><i>Pelvic ultrasound:</i> Lack of follicular development and/or lack of dominant follicle with amenorrhea</p>
Skeletal	Bone pain with exercise; point tenderness; in severe cases, short stature and arrested skeletal growth (more likely in AN than in BN)	<p><i>Radiography and bone scans:</i> Increased rate of pathological stress fractures (more likely in AN than BN)^d; delayed bone age in some patients with AN</p> <p><i>DEXA:</i> Osteopenia or osteoporosis, especially in hip and lumbar spine (more likely in AN than BN)^d</p>

Note. More information on the physical complications of anorexia nervosa is available in Birmingham CL, Beumont PJV: *Medical Management of Eating Disorders*. Cambridge, UK, Cambridge University Press, 2004. AN = anorexia nervosa; BN = bulimia nervosa; CT = computed tomography; DEXA = dual energy X-ray absorptiometry; ECG = electrocardiogram; EEG = electroencephalogram; EMG = electromyogram; fMRI = functional magnetic resonance imaging; MRI = magnetic resonance imaging; PET = positron emission tomography.

^aAnthropometrics estimate only peripheral fat. Underwater weighing assesses total body fat.

^bBecause QTc prolongation may be associated with sudden death, other medications known to prolong QTc intervals should

generally be avoided and any electrolyte abnormalities (e.g., hypokalemia) and hypomagnesemia should be corrected if QTc prolongation is present. In anorexia nervosa, QTc intervals typically normalize with refeeding.

^cSome chronically ill patients have renal abnormalities associated with decreased urinary volume. Some drink excessive amounts of fluids to assuage hunger, producing increased urinary volume.

^dAlthough patients with bulimia nervosa who are of normal weight may not need extensive evaluation for osteopenia or osteoporosis, those who have had previous episodes of anorexia nervosa may be at higher risk for these abnormalities and require a similar assessment to that recommended for patients with anorexia nervosa.

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