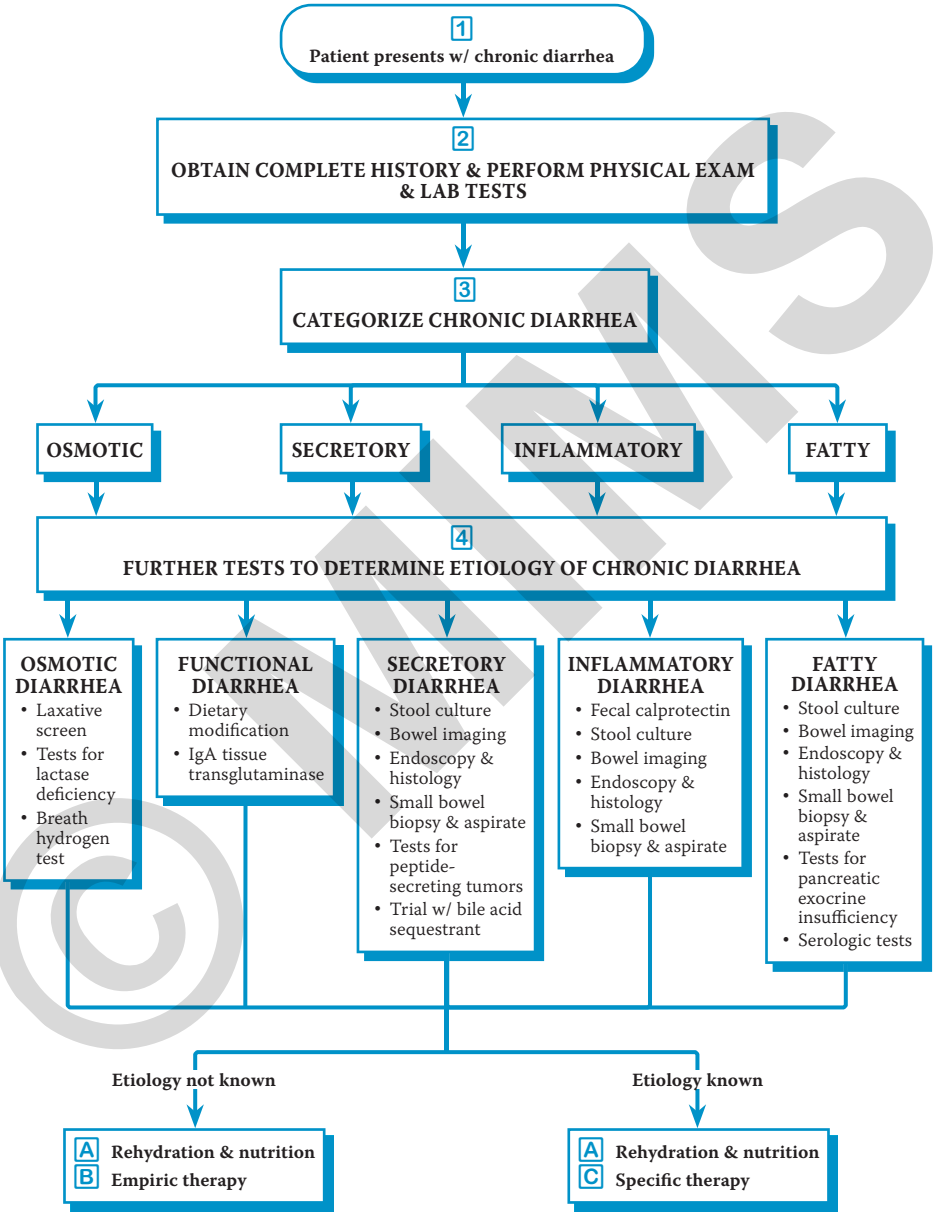
Diarrhea in Adults - Chronic (1 of 11)



1 CHRONIC DIARRHEA

- Defined as the abnormal passage of ≥3 loose or liquid stools per day for ≥4 weeks w/ or without a daily stool weight of >200 g/day; urgency to defecate may be present
  - A definition of chronic diarrhea based on symptoms alone will lead to an overlap w/ functional bowel disorders, eg irritable bowel syndrome (IBS)

2 DIAGNOSIS

A detailed medical history assists in:
- Categorizing symptoms as being more likely due to an organic versus a functional cause
- Determining specific causes of diarrhea
  - Differentiating malabsorptive diarrhea from colonic or inflammatory diarrhea

Characteristics of Diarrhea

Duration & Pattern
- Identify aggravating (eg diet, stress) & relieving factors (diet, over-the-counter & prescription drugs)
- Diarrhea that is continuous or nocturnal & lasting <3 months is more likely due to an organic disease
- Diarrhea occurring after meals is common in patients w/ IBS while diarrhea after a long period of constipation is seen w/ impaction w/ overflow diarrhea
- Diarrhea should be differentiated from fecal incontinence
  - Many patients do not volunteer incontinence as a symptom & will instead describe it to the doctor as diarrhea

Associated Symptoms
- Alarm symptoms include abdominal pain or discomfort, unintentional weight loss of >5 kg, GI bleeding & fever
  - The absence of abdominal pain during defecation & presence of weight loss are points against the diagnosis of functional bowel syndrome eg IBS
- Other symptoms include bloating & flatulence which may indicate a malabsorption syndrome or food intolerance, nausea & vomiting (N/V) & dehydration

Stool Characteristics
- Blood in the stool may be due to malignancy, inflammatory bowel disease (IBD), hemorrhoids or infection w/ invasive organisms
- Tan or white-colored stool may suggest celiac disease
- Food particles or oil in the stool may be due to malabsorption, maldigestion or a decreased intestinal transit time
- Watery stools imply an osmotic or secretory process
- Voluminous, watery diarrhea suggests a disorder of the small bowel or proximal colon
- Frequent, small-volume diarrhea may be associated w/ the colon or rectum

Pertinent Points in the History

Patient's Diet
- Ingestion of large amounts of poorly absorbable carbohydrates, eg sorbitol, mannitol & fructose, which may be present in fruit juices, soft drinks, diet candies
- Excess coffee/caffeine consumption
- Fiber intake
- Raw seafood or shellfish
- Milk products, including raw milk & lactose

Medical History
- History of recurrent bacterial infections may point to a primary immunoglobulin deficiency
- Previous surgery, pancreatic disease or radiation therapy, eg pelvic irradiation
  - Extensive resections of the ileum & right colon may substantially decrease absorptive capacity of surface, resulting in fat & carbohydrate or bile acid malabsorption & decreased transit time
  - Cholecystectomy may decrease transit time, bile acid malabsorption & increase enterohepatic cycling of bile acids
- The following may predispose to diarrhea via different mechanisms:
  - Thyrotoxicosis, parathyroid disease, diabetes mellitus (DM), adrenal disease, systemic sclerosis, celiac disease, colitis, IBS, IBD, lactose intolerance

Intake of Drugs or Alcohol
- Alcohol abuse may result in decreased transit time, decreased pancreatic function & decreased activity of intestinal disaccharidases
- Investigate intake of prescription drugs & over-the-counter medicines including herbal therapy & supplements
  - Drugs such as magnesium (Mg)-containing products, antihypertensives, nonsteroidal anti-inflammatory drugs (NSAIDs) & antibiotics may cause diarrhea
- Recent antibiotic therapy may make a patient prone to *Clostridioides difficile*-associated diarrhea (*please see Clostridioides difficile Infection disease management chart for further information*)

2 DIAGNOSIS (CONT'D)

Pertinent Points in the History (Cont'd)

History of Travel

- Investigate possibility of exposure to infectious gastrointestinal (GI) pathogens, eg parasites & protozoa

Family History

- Ask patient about a family history of inflammatory bowel, neoplastic or celiac disease, thyroid diseases or congenital diarrheal disorders

Social History

- Drinking water source
- Sexual preference & activity [risk factors for human immunodeficiency virus (HIV) infection]
- Patient's occupation, area of residence

Physical Examination

Physical findings are usually more useful in establishing the severity of diarrhea than in determining its etiology

- Assess patient's volume status, eg skin appearance, dry mouth, orthostatic changes in blood pressure, pulse
- Look for signs of toxicity including fever & signs of nutrient malabsorption, eg muscle wasting, anemia, scars from previous abdominal surgery, impaired cognitive function
- Perform an abdominal exam to check bowel sounds & the presence of distension, tenderness or masses; a rectal exam (including a digital rectal exam) may show an abnormal sphincter tone suggesting fecal incontinence or anal fistulae suggesting Crohn's disease
- Check for findings consistent w/ systemic diseases that may present w/ chronic diarrhea [eg tremor & exophthalmos in hyperthyroidism, lymphadenopathy in acute immune deficiency syndrome (AIDS), etc]

INITIAL LABORATORY TESTS FOR CHRONIC DIARRHEA

In cases when findings from history & physical exam point to a particular diagnosis, it may be practical to proceed immediately to confirmatory tests for the specific disorder

Blood Tests

- Complete blood count (CBC) to check for anemia & leukocytosis
- Erythrocyte sedimentation rate (ESR)
- Chemistries: Protein/globulin, albumin, urea, serum electrolytes, calcium
- Others: Liver function tests (LFTs), vitamin B12, folate, ferritin, C-reactive protein (CRP)
- Thyroid function tests

Stool Tests

Inspection of the Stool

- May be done during rigid sigmoidoscopy without bowel preparation or
- Stool collection over 24-48 hours or random sample

Stool Microscopy

- Examine for ova & parasites

Stool Weight

- May provide best information to the potential metabolic impact of diarrhea
- May limit unnecessary tests if values <200 g/day are obtained

Stool Osmolality & Osmotic Gap

- Measurement of stool sodium & potassium concentrations allows calculation of the osmotic gap in stool water; normal fecal osmolality is 290 mOsm/kg
  - A small osmotic gap is characteristic of secretory diarrhea
  - A large osmotic gap is characteristic of osmotic diarrhea
- A low stool osmolality may be due to contamination of the stool sample by the addition of water or dilute urine or by the ingestion of large amounts of hypotonic fluid

Stool Fat

- Fat excretion >14 g in 24 hours points to a high probability of defective fat absorption
- For the test to be valid, patients should have a fat intake of 100 g/day 3 days before the specimen collection

Tests on Stool Water

- The pH of stool water is often <6 in carbohydrate malabsorption resulting in carbohydrate fermentation; fecal pH test may be done in all patients presenting w/ fatty diarrhea
- In cases where there is a high index of suspicion of factitious diarrhea due to surreptitious laxative use, stool water may be analyzed for laxatives using chemical or chromatographic tests

Stool Occult Blood & Leukocytes

- Presence of occult blood or leukocytes may help identify inflammatory diarrheas

3 CATEGORIES OF CHRONIC DIARRHEA

- Stool frequency, consistency & volume can aid in categorization
- Some categories overlap; thus, it is prudent to first categorize the type of diarrhea before a full diagnostic evaluation & treatment as this narrows down the differential diagnoses & reduces unnecessary testing

Watery Diarrhea

Osmotic Diarrhea

- Water is retained due to substances that are poorly absorbed; stool osmotic gap is >125 mOsm/kg
  - Ingestion of exogenous Mg from Mg-containing antacids
  - Ingestion of laxatives
  - Ingestion of poorly absorbable carbohydrates, eg lactase & fructose
  - Celiac disease

Functional Diarrhea

- A type of watery diarrhea that has hypermotility & small-volume stool (<350 mL/day); osmotic gap is within reference range of 50-125 mOsm/kg
- Responds to a modified diet low in fermentable carbohydrates & high in fiber, & improves at night & w/ fasting
- Often caused by IBS
- Diagnostic criterion includes watery or loose stools, without bothersome bloating or predominant abdominal pain in >25% of bowel movements for the last 3 months w/ symptoms starting at least 6 months prior to diagnosis (Rome IV)
  - Should not include patients fulfilling the criteria for diarrhea-predominant IBS

Secretory Diarrhea

- Reduced water absorption, stool volume >1 L/day, frequently occurs at night, & continues despite fasting; stool osmotic gap is <50 mOsm/kg
  - Small bowel bacterial overgrowth
  - Endocrine diarrhea, eg hyperthyroidism, Addison disease
  - Structural diseases, eg short bowel syndrome, IBD, tumors, gastrocolic or enteroenteric fistula, mucosal diseases
  - Peptide-secreting tumors, eg carcinoid syndrome, Zollinger-Ellison syndrome (ZES), glucagonoma
  - Medications: Antiarrhythmics, antibiotics, antihypertensives, antineoplastics, biguanides, Calcitonin, Colchicine, Digitalis, NSAIDs, prostaglandins, proton pump inhibitors, selective serotonin reuptake inhibitors, Ticlopidine
  - Previous GI surgery

Inflammatory Diarrhea

- Increased white cell count w/ occult or frank pus or blood
  - Invasive infections
  - Pseudomembranous colitis, IBD, ischemia, radiation enteritis
  - Neoplasm
  - The above conditions may produce a secretory diarrhea without inflammatory markers in the stool & therefore should be considered in the evaluation of secretory diarrhea as well

Fatty Diarrhea

- Abdominal distension & bloating w/ malodorous, large, floating, pale fatty stool
  - Maldigestion (inadequate luminal breakdown of triglyceride): Pancreatic exocrine insufficiency, inadequate luminal bile acid eg primary biliary cholangitis (PBC)
  - Malabsorption (inadequate mucosal transport of the products of digestion): Celiac disease, Orlistat & Acarbose drugs, giardiasis
  - Small bowel bacterial overgrowth
  - Previous GI surgery

4 FURTHER TESTS TO DETERMINE ETIOLOGY OF CHRONIC DIARRHEA

Stool Analysis

- Mg, which may be ingested through laxatives, antacids & mineral supplements, may be measured in stool water through spectrophotometry
- Fecal calprotectin & fecal lactoferrin
  - Considered as adjunctive tests in evaluating chronic diarrhea as levels are increased in intestinal inflammation & may help identify inflammatory causes
  - Threshold values of 50 µg/g for fecal calprotectin & 4-7.25 µg/g for fecal lactoferrin are used to optimize sensitivity for IBD

4 FURTHER TESTS TO DETERMINE ETIOLOGY OF CHRONIC DIARRHEA (CONT'D)

Stool Culture

- Bacterial infections are seldom the cause of chronic diarrhea in immunocompetent patients
- Clarify HIV status of patient because persons w/ HIV-AIDS are more likely to have an infectious cause for chronic diarrhea
- Infection should still be excluded by culture & special tests for other organisms
- Organisms which may cause infectious chronic diarrhea include protozoa eg *Giardia* & *Entamoeba* spp, *Aeromonas*, *Plesiomonas*, *Candida* spp, parasites eg *Strongyloides* & *Cryptosporidium* spp, microsporidia

Bowel Imaging

- Radiography of the stomach & colon may be complementary to endoscopy & colonoscopy because barium-contrast radiographs can detect fistulas & strictures better
- Small bowel imaging w/ barium follow through or enteroclysis should be reserved for patients where malabsorption is suspected & distal duodenal histology is normal; used to rule out small bowel cancer & anatomic defects
- Mesenteric angiography may show evidence of rare cases of intestinal ischemia due to vasculitis or atherosclerosis
- Computed tomography (CT) scan may be used for the following:
  - To examine the pancreas for cancer or chronic pancreatitis
  - To detect IBD, tuberculosis (TB), intestinal lymphoma, carcinoid syndrome & other neuroendocrine tumors

Endoscopy & Histology

- Endoscopic investigation is warranted if patient is unresponsive to therapy, symptoms are persistent, & if diagnosis is inconclusive
- Full colonoscopy should be done in the following cases:
  - If there is significant weight loss
  - Presence of occult/gross bleeding suggesting malignancy
  - When abnormal terminal ileum or proximal colon has been seen on radiograph
  - In patients >50 years old for screening purposes
- Endoscopy or enteroscopy is used to visualize the small bowel & colon & to do a directed biopsy
- Flexible sigmoidoscopy is typically sufficient for patients <45 years old w/ chronic diarrhea &/or atypical symptoms
- Colonoscopy w/ ileoscopy is recommended for patients >45 years old w/ chronic diarrhea
- Random biopsy samples should be taken from several locations, including normal areas, to give the pathologist a greater chance of establishing the diagnosis

Small Bowel Biopsy & Aspirate

- Cultures of small bowel aspirates are the most sensitive test for small bowel bacterial overgrowth; however, they may not reflect clinically significant overgrowth
- Small bowel biopsies may establish diffuse mucosal diseases that give rise to malabsorption
  - Should be performed to confirm positive serologic test for celiac disease prior to placing a patient on a gluten-free diet

Serologic Tests

- Serologic testing for celiac disease may be considered in populations w/ a high prevalence for this disorder
  - Tests include screening for IgA or IgG tissue transglutaminase & IgA or IgG deaminated gliadin peptides
- Other serologic tests may include detection of antibodies to *Entamoeba histolytica* for amoebiasis, fecal antigen for giardiasis, antibodies to HIV for HIV/AIDS & antinuclear antibody in conditions, eg scleroderma, vasculitis, hypothyroidism

Tests for Lactase Deficiency

- Lactase activity decreases rapidly in most non-Caucasian populations after the age of 2 years & lactase deficiency is considered normal in these populations
- Lactase deficiency can be diagnosed by lactose hydrogen breath tests & lactose tolerance tests

Breath Hydrogen Test

- Used in evaluating patients for chronic osmotic diarrhea
- An increase in breath hydrogen concentration represents bacterial fermentation & indicates that unabsorbed carbohydrate (eg fructose, sucrose) has reached the colon
- Tests may use lactose, glucose, lactulose & d-xylose
- Provides only supportive evidence of the diagnosis

Tests for Bile Acid Diarrhea

- Total bile acid measured in a 48-hour stool collection identifies increased fecal bile acids
- Serum fibroblast growth factor 19 level measures a feedback defect in the synthesis of bile acids
- Selenium homotaurocholic acid test identifies patients w/ diarrhea caused by malabsorption of bile acids
- If above tests are not available, bile acid sequestrants can be empirically given to patients & clinical improvement suggests bile acid diarrhea

4 FURTHER TESTS TO DETERMINE ETIOLOGY OF CHRONIC DIARRHEA (CONT'D)

Tests for Pancreatic Exocrine Insufficiency
- Tests include secretin test, bentiromide test, fecal elastase & stool chymotrypsin activity
- Fecal elastase testing is reliable & convenient, & may be a good first choice in patients in whom chronic diarrhea is thought to be of pancreatic origin
  - Only reliable in moderate/severe pancreatic disease w/ poor sensitivity for mild disease
- Endoscopic retrograde cholangiopancreatography (ERCP) has the greatest sensitivity for diagnosis of pancreatic ductal changes
- Magnetic resonance cholangiopancreatography (MRCP) may be as sensitive as ERCP for detecting chronic pancreatitis & pancreatic cancer

Tests for Peptide-Secreting Tumors
- Diarrhea due to hormone-secreting tumors is very rare
- Testing is only recommended for patients w/ high-volume watery diarrhea & only when other causes have been excluded
- Testing may involve detection in the blood of excess vasoactive intestinal peptide, gastrin, calcitonin, glucagon, adrenocorticotropic hormone, & urinary metabolites of endocrine mediators (eg 5-hydroxyindole acetic acid, metanephrines)

A REHYDRATION & NUTRITION

- Administer fluids & electrolytes to manage dehydration & maintain hydration
  - Oral rehydration solution may be given; consider giving IV fluids if patient cannot tolerate oral therapy or is markedly dehydrated
  - *Please see Diarrhea in Adults - Infectious disease management chart for specific therapy*
- Cereal-based solutions increase salt & water absorption but diarrhea may worsen w/ their use
  - Can be lifesaving in dehydrating acute secretory diarrheas (eg cholera) but use in chronic diarrhea has not been well studied
- Patients w/ chronic diarrhea should be given adequate nutritional support[1]
  - Provide patients w/ appropriate dietary recommendations & calorie requirements

[1]Various appetite enhancers & enteral nutritional products are available. Please see the latest MIMS for specific formulations & prescribing information

B EMPIRIC THERAPY

Treatment Trial
- In some cases, treatment may include stopping a food or drug
  - Lactose-containing foods or drinks
  - Sugar-free products w/ sorbitol & foods made w/ fat replacements
  - Drugs such as laxatives & antacids
- Resolution of diarrhea after a 72-hour fast indicates a diet-related cause for osmotic chronic diarrhea
- Patients w/ functional diarrhea whose symptoms improve w/ a modified diet low in fermentable carbohydrates are likely to have IBS than celiac disease

Indications for Empiric Therapy
- Initial treatment before diagnostic testing
- When a diagnosis is strongly suspected & follow-up is available
- When there is no confirmed diagnosis after testing
- When a diagnosis has been established but specific treatment is either unavailable or has proven ineffective
- When comorbidities limit diagnostic investigation
- When resources are limited

Antidiarrheals
- Symptomatic treatment may be needed in patients because specific treatment may not be available
- Antidiarrheals can decrease stool frequency & stool weight along w/ associated symptoms eg abdominal cramps

Antipropulsives
- Include natural opioids (eg Codeine, Opium, Morphine) & synthetic opioids (eg Diphenoxylate, Loperamide)
- The natural opiates are highly potent remedies for diarrhea
  - Patients need to be informed about the abuse potential of these drugs; though in practice, these substances are rarely abused by chronic diarrhea sufferers
- Synthetic opioids are less potent but usually are adequate to control less severe diarrhea & should be used first prior to more potent agents
- Dose should be started at a low level & titrated up as needed to achieve effectiveness
- Use of these drugs should be monitored closely

Bismuth Preparations
- Shown to be effective in acute traveler's diarrhea but effectiveness in chronic diarrhea has not yet been proven
- Bismuth subsalicylate has antisecretory, antibacterial & anti-inflammatory effects

Not all products are available or approved for above use in all countries.
Specific prescribing information may be found in the latest MIMS.

B EMPIRIC THERAPY (CONT'D)

Other Antidiarrheal Agents

- Intestinal Adsorbents
  - Include Attapulgite, Activated charcoal, Kaolin, Pectin, Dioctahedral smectite
    - Few controlled studies of these agents in chronic diarrhea & results have been inconclusive
- Bile Acid Sequestrant
  - Eg Cholestyramine
  - Effective for short-term treatment of diarrhea secondary to bile acid malabsorption

Nonspecific Agents for Diarrhea

Bulk-Producing Laxatives

- Eg Psyllium
  - Psyllium may alter stool consistency, changing watery stools to semi-formed ones

Clonidine

- An alpha-adrenergic agonist, decreases gut motility & intestinal transport
- Antihypertensive effect limits its use in most patients but could be useful in diabetics

Octreotide

- A somatostatin analogue that may improve endocrine diarrhea, dumping syndrome & AIDS diarrhea
- Usually considered a 2nd-line agent compared to opiates because of its administration by injection & cost

Probiotics

- May stimulate local immunity by modifying colonic flora & may be useful for antibiotic-associated diarrhea

Other Empiric Therapies

Pancreatic Enzyme Supplementation

- A therapeutic supplementation trial is occasionally given in patients suspected of having pancreatic exocrine insufficiency

Conjugated Bile Acid Supplementation

- Reduction of steatorrhea through empiric supplementation may be used to confirm the diagnosis of bile acid deficiency

C SPECIFIC THERAPY

- Institute specific therapy once the cause of chronic diarrhea is established
- Please see the following disease management charts for further information:
  - *Clostridioides difficile* Infection
  - Diarrhea in Adults - Infectious
  - Inflammatory Bowel Disease
  - Irritable Bowel Syndrome
  - Pancreatitis - Chronic
  - Parasitic Infections
  - Primary Biliary Cholangitis
  - Zollinger-Ellison Syndrome

SPECIALIST REFERRAL

- Consider referring to the following specialists as indicated:
  - Gastroenterologist: For patients w/ chronic diarrhea presenting w/ alarm symptoms or those who require a GI endoscopy
  - Endocrinologist: For patients w/ suspected or confirmed chronic diarrhea that is endocrine-related
  - Dietitian: For patients needing assistance w/ diet modification in managing celiac disease or IBS

PREVENTION/PATIENT EDUCATION

- Counsel patients to avoid foods or medications that can cause diarrhea
- Avoid consuming raw or undercooked food except peeled fruits or vegetables which can be washed thoroughly
- Drink boiled, filtered or bottled water while traveling
- Other general measures in preventing diarrhea include washing of hands w/ soap & clean water, practice safe food processing, handling & storage, & proper human waste & garbage disposal fr diarrhea infectious chart

Dosage Guidelines

ANTIDIARRHEAL MICROORGANISMS

Drug	Dosage	Remarks
Bacillus clausii	2-3 vials PO 24 hrly	**Special Instructions** • Given in interval between antibiotic doses
Bifidobacterium longum[1]	1-2 cap PO 24 hrly	**Special Instructions** • Use w/ caution in patients w/ lactose-related allergy, pregnancy
Lactobacillus acidophilus[1]	1-4 cap or tab PO 8-24 hrly **or** 1-2 sachet PO 8-24 hrly	**Special Instructions** • Taken on an empty stomach; if GI discomfort occurs, may take w/ meals
Lactobacillus reuteri	1 tab PO 24 hrly	**Special Instructions** • May be taken w/ or without food
Saccharomyces boulardii	250 mg PO 12-24 hrly	**Adverse Reactions** • Dermatologic effects (rash, urticaria, pruritus); Other effects (flatulence, angioedema, shock) **Special Instructions** • Use w/ caution in diarrhea >2 days, pregnancy, lactation • Contraindicated in patients allergic to yeast, immunocompromised patients

[1]Various combination products are available. Please see the latest MIMS for specific formulations.

ANTIPROPULSIVES

Drug	Dosage	Remarks
Natural Opioids		
Codeine	30 mg PO 6-8 hrly	**Adverse Reactions** • GI effects (N/V, constipation, dry mouth); CNS effects (dizziness, drowsiness, confusion, headache, vertigo, mood changes); CV effects (flushing, bradycardia, tachycardia, orthostatic hypotension); Other effects (hypersensitivity reactions, urinary retention) **Special Instructions** • Avoid in acute resp depression, obstructive airway disease, acute alcoholism, convulsive disorders, head injuries & conditions in which intracranial pressure is raised • Use w/ caution in hypothyroidism, adrenocortical insufficiency, asthma or decreased resp reserve, renal or hepatic impairment, hypotension, prostatic hyperplasia
Morphine	5-10 mg PO 6-8 hrly	
Opium tincture	0.6 mL of 1% soln PO 6 hrly	

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Dosage Guidelines

ANTIPROPULSIVES (CONT'D)

Drug	Dosage	Remarks
Synthetic Opioids		
Diphenoxylate/ Atropine sulfate	Diphenoxylate 2.5 mg/ Atropine sulfate 0.025 mg, 1-2 tabs PO 6-8 hrly **Max dose:** 8 tabs/day	**Adverse Reactions** • GI effects (anorexia, N/V, abdominal distension, pancreatitis, paralytic ileus, toxic megacolon); Hypersensitivity reactions (urticaria, pruritus, gum swelling, angioedema); CNS effects (drowsiness, restlessness, euphoria, depression, headache, numbness) • Atropine: Dry mouth, dysphagia, pupillary dilatation w/ loss of accommodation, flushed & dry skin, disturbances in cardiac rate & rhythm, difficulty in micturition, constipation **Special Instructions** • Avoid in patients w/ jaundice, intestinal obstruction, antibiotic-associated colitis, enterotoxigenic diarrhea • Use w/ caution in patients w/ IBD, hepatic impairment
Loperamide	**Initial dose:** 4 mg PO Followed by 2 mg PO after each unformed stool **Max dose:** 16 mg/day	**Adverse Reactions** • GI effects (dry mouth, abdominal pain, N/V, constipation, rarely paralytic ileus); Other effects (hypersensitivity reactions, drowsiness) **Special Instructions** • Do not use in patients w/ ileus, abdominal distension, acute IBD, antibiotic-associated colitis, or any other condition for which inhibition of peristalsis must be avoided • Use w/ caution in patients w/ hepatic impairment, persistent diarrhea

ANTISPASMODICS

Drug	Dosage	Remarks
Synthetic Anticholinergics		
Chlordiazepoxide/ Clidinium bromide	Chlordiazepoxide 5-10 mg/Clidinium bromide 2.5-5 mg PO 6-8 hrly	**Adverse Reactions** • CNS effects (sedation, drowsiness, muscle weakness, ataxia; less commonly slurred speech, vertigo, headache, confusion); Other effects (urinary & GI disturbances, hypotension); symptoms decrease after continued use • Paradoxical excitement can occur • Clidinium bromide: Dry mouth, dysphagia, pupillary dilatation w/ loss of accommodation, flushed & dry skin, disturbances in cardiac rate & rhythm, difficulty in micturition, constipation **Special Instructions** • Avoid in patients w/ jaundice, intestinal obstruction, antibiotic-associated colitis, enterotoxigenic diarrhea, prostatic hypertrophy, glaucoma • Use w/ caution in patients w/ IBD, hepatic impairment

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Dosage Guidelines

ANTISPASMODICS (CONT'D)

Drug	Dosage	Remarks
Synthetic Anticholinergics (Cont'd)		
Mebeverine hydrochloride	135 mg PO 8 hrly **or** 200 mg PO 12 hrly	**Adverse Reactions** • CNS effects (dizziness, headache, insomnia, anorexia); Other effects (GI disturbances, bradycardia, urticaria, angioedema, face edema) **Special Instructions** • Avoid in patients w/ paralytic ileus • Use w/ caution in patients w/ marked hepatic or renal impairment & in those w/ CV disorders

BILE ACID SEQUESTRANT

Drug	Dosage	Remarks
Colestyramine (Cholestyramine)	4 g/sachet, 1 sachet in 150 mL liqd PO 6-8 hrly	**Adverse Reactions** • GI effects (constipation, nausea, flatulence, anorexia, epigastric burning); Other effects (rash, bleeding, osteoporosis) **Special Instructions** • Avoid in patients w/ complete biliary obstruction & hypersensitivity to anionic exchange resins, in pregnancy

BULK-PRODUCING LAXATIVE

Drug	Dosage	Remarks
Ispaghula (Psyllium)	1 sachet dissolved in 150 mL water PO 8-24 hrly **or** Initially 2 tsp PO 8 hrly for 1-3 days & if necessary, 1 tsp PO 8 hrly thereafter	**Adverse Reactions** • Large quantities may temporarily increase flatulence & abdominal distension; hypersensitivity reactions; intestinal/esophageal obstruction & fecal impaction especially if swallowed dry **Special Instructions** • Avoid in patients w/ difficulties swallowing, those w/ preexisting fecal impaction, intestinal obstruction or colonic atony

GIT REGULATORS, ANTIFLATULENTS & ANTI-INFLAMMATORIES

Drug	Dosage	Remarks
Trimebutine	600 mg/day PO in divided doses	**Adverse Reactions** • Syncope, presyncope, skin reaction **Special Instructions** • Use w/ caution in patients w/ diabetes • Treatment must be short term

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Dosage Guidelines

INTESTINAL ADSORBENTS		
Drug	**Dosage**	**Remarks**
Bismuth Preparation		
Bismuth subsalicylate	524-750 mg PO every 30 min-1 hr as required **Max dose:** 8 doses/day	**Adverse Reactions** • Long-term use may produce tinnitus; allergic reactions in salicylate-sensitive patients; black discoloration of the tongue & black stools from nonabsorbable Bismuth salts **Special Instructions** • Use w/ caution in patients w/ gout, renal insufficiency & those taking anticoagulants, Probenecid, Methotrexate, Aspirin-containing drugs • Brushing the teeth & tongue, rinsing mouth w/ water after each dose may help to prevent tongue discoloration
Other Intestinal Adsorbents		
Attapulgite	**Initial dose:** 1200-1500 mg PO Followed by 1200-1500 mg PO after each bowel movement **Max dose:** 9000 mg/day	**Adverse Reactions** • Constipation, fecal impaction if given in large doses **Special Instructions** • Avoid in patients w/ chronic or invasive infectious diarrhea, GI tract stenotic lesions, high fever
Charcoal (Activated charcoal)	500 mg-1 g PO 6-8 hrly	**Adverse Reactions** • Black feces, may decrease GI motility **Special Instructions** • May decrease the absorption of many drugs; avoid simultaneous oral therapy
Dioctahedral smectite	3 g/sachet, 1 sachet dissolved in liqd PO 6-12 hrly	**Adverse Reactions** • Rarely constipation **Special Instructions** • May decrease the absorption of many drugs; avoid simultaneous oral therapy
Kaolin/Pectin	Various strengths are available. Individualize dose based on manufacturer's recommendations	**Adverse Reactions** • Very rarely, constipation that may cause fecal impaction **Special Instructions** • May decrease the absorption of many drugs; avoid simultaneous oral therapy • Contraindicated in intestinal obstruction & spastic bowel condition

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Please see the end of this section for the reference list.