

Table 24.6 Medications Used to Treat Inflammatory Bowel Disease (Ulcerative Colitis and Crohn's Disease)

Medication	Indications	Dosing	Side effects affecting rehab	Other side effects	Drug interactions and considerations
Corticosteroids					
Rectal: Hydrocortisone (Cortenema)	Induces remission in UC.	100-200 mg rectally/day in 1-2 divided doses. Remission occurs in 4-8 wks.	Cog: + S: 0 A: + Motor: + D: + Com: 0 F: +	Short term: Acne, adrenal axis suppression, edema, increased appetite, weight gain, hypertension, mood changes. Long term: Cataracts, diabetes, muscle atrophy, bone demineralization.	40%-50% of patients become steroid dependent. Supplement daily with calcium (1000 mg/day; 1500 mg/day if >50 yr of age) and vitamin D (400-800 iu). Bisphosphonates should be added for patients on steroids >3 mo.
Rectal: Hydrocortisone (Cortifoam)	Induces remission in UC.	80-160 mg rectally/day in 1-2 divided doses. Remission occurs in 4-8 wk.	Cog: + S: 0 A: + Motor: + D: + Com: 0 F: +	Short term: Acne, adrenal axis suppression, edema, increased appetite, weight gain, hypertension, mood changes. Long term: Cataracts, diabetes, muscle atrophy, bone demineralization.	40%-50% of patients become steroid dependent. Supplement daily with calcium (1000 mg/day; 1500 mg/day if >50 yr of age) and vitamin D (400-800 iu). Bisphosphonates should be added for patients on steroids >3 mo.
Oral: Prednisone	Induces remission in moderate to severe Crohn's disease or UC.	20-60 mg by mouth/day in 1-2 divided doses.	Cog: + S: 0 A: + Motor: + D: + Com: 0 F: +	Short term: Acne, adrenal axis suppression, edema, increased appetite, weight gain, hypertension, mood changes. Long term: Cataracts, diabetes, muscle atrophy, bone demineralization.	40%-50% of patients become steroid dependent. Supplement daily with calcium (1000 mg/day; 1500 mg/day if >50 yr of age) and vitamin D (400-800 iu). Bisphosphonates should be added for patients on steroids >3 mo.
Oral: Budesonide (Entocort)	Induces remission in moderate to severe Crohn's disease or UC.	9 mg by mouth once daily.	Cog: + S: 0 A: + Motor: + D: + Com: 0 F: +	Short term: Acne, adrenal axis suppression, edema, increased appetite, weight gain, hypertension, mood changes. Long term: Cataracts, diabetes, muscle atrophy, bone demineralization.	40%-50% of patients become steroid dependent. Supplement daily with calcium (1000 mg/day; 1500 mg/day if >50 yr of age) and vitamin D (400-800 iu). Bisphosphonates should be added for patients on steroids >3 mo.
Injectable:	Induces	40 mg IV daily.	Cog: ++	Short term: Acne,	40%-50% of patients

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Methylprednisolone (Solu-Medrol)	remission in moderate to severe Crohn's disease or UC.		S: 0 A: ++ Motor: + D: + Com: 0 F: +	adrenal axis suppression, edema, increased appetite, weight gain, hypertension, mood changes. Long term: Cataracts, diabetes, muscle atrophy, bone demineralization.	become steroid dependent. Supplement daily with calcium (1000 mg/day; 1500 mg/day if >50 yr of age) and vitamin D (400-800 international units). Bisphosphonates should be added for patients on steroids >3 mo.
5-Aminosalicylic acid agents					
Mesalamine (Asacol)	Maintenance therapy in mild to moderate UC or Crohn's disease.	2.4-4.8 g by mouth/day in 3-4 divided doses.	Cog: 0 S: 0 A: 0 Motor: 0 D: +++ Com: 0 F: 0	Asthenia, flu-like symptoms, abdominal pain, flatulence, arthralgias, lupus-like syndrome, hepatotoxicity, pancreatitis, gastrointestinal upset, bone marrow suppression, interstitial nephritis, interstitial pneumonitis.	Monitor with baseline CBC, then repeat weekly for 1 mo, then recheck every 1-2 mo. Onset of effects is 6 wk-3 mo. Contraindications: G6PD deficiency.
Sulfasalazine (Azulfidine)	Maintenance therapy in mild to moderate UC or Crohn's disease.	3-6 g by mouth/day in 3-4 divided doses.	Cog: 0 S: 0 A: 0 Motor: 0 D: +++ Com: 0 F: 0	Leukopenia, alopecia, stomatitis, elevated liver enzymes, yellow-orange skin discoloration, photosensitivity. Minimize nausea, vomiting, diarrhea, and anorexia with low-dose initiation and slow titration. Treat rash, urticaria, serum sickness-like reactions with antihistamines or steroids. Hypersensitivity reactions require discontinuance.	Monitor with baseline CBC, then repeat weekly for 1 mo, then recheck every 1-2 mo. Onset of effects is 6 wk-3 mo.

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Balsalazide (Colazal)	Maintenance therapy in mild to moderate UC or Crohn's disease.	6.75 g by mouth/day in 3 divided doses.	Cog: 0 S: 0 A: 0 Motor: 0 D: +++ Com: 0 F: 0	Asthenia, flu-like symptoms, abdominal pain, flatulence, arthralgias, lupus-like syndrome, hepatotoxicity, pancreatitis, gastrointestinal upset, bone marrow suppression, interstitial nephritis, interstitial pneumonitis.	Monitor with baseline CBC, then repeat weekly for 1 mo, then recheck every 1-2 mo. Onset of effects is 6 wk-3 mo.
Olsalazine (Dipentum)	Maintenance therapy in mild to moderate UC or Crohn's disease.	2-3 g by mouth/day in 2 divided doses.	Cog: 0 S: 0 A: 0 Motor: 0 D: +++ Com: 0 F: 0	Asthenia, flu-like symptoms, abdominal pain, flatulence, arthralgias, lupus-like syndrome, hepatotoxicity, pancreatitis, gastrointestinal upset, bone marrow suppression, interstitial nephritis, interstitial pneumonitis.	Monitor with baseline CBC, then repeat weekly for 1 mo, then recheck every 1-2 mo. Onset of effects is 6 wk-3 mo.
Mesalamine (Pentasa)	Maintenance therapy in mild to moderate UC or Crohn's disease.	3-4 g by mouth/day in 2-3 divided doses.	Cog: 0 S: 0 A: 0 Motor: 0 D: +++ Com: 0 F: 0	Asthenia, flu-like symptoms, abdominal pain, flatulence, arthralgias, lupus-like syndrome, hepatotoxicity, pancreatitis, gastrointestinal upset, bone marrow suppression, interstitial nephritis, interstitial pneumonitis.	Monitor with baseline CBC, then repeat weekly for 1 mon, then recheck every 1-2 mon. Onset of effects is 6 wks-3 mon. Contraindications: G6PD deficiency.
Mesalamine (Canasa)	Maintenance therapy in mild to moderate UC.	1 g rectally/day in 1-2 divided doses.	Cog: 0 S: 0 A: 0 Motor: 0 D: +++ Com: 0 F: 0	Asthenia, flu-like symptoms, abdominal pain, flatulence, arthralgias, lupus-like syndrome, hepatotoxicity, pancreatitis, gastrointestinal	Monitor with baseline CBC, then repeat weekly for 1 mon, then recheck every 1-2 mon. Onset of effects is 6 wks-3 mon. Contraindications: G6PD deficiency.

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				upset, bone marrow suppression, interstitial nephritis, interstitial pneumonitis.	
Mesalamine (Rowasa)	Maintenance therapy in mild to moderate UC.	2-4 g rectally/day in 1-2 divided doses.	Cog: 0 S: 0 A: 0 Motor: 0 D: +++ Com: 0 F: 0	Asthenia, flu-like symptoms, abdominal pain, flatulence, arthralgias, lupus-like syndrome, hepatotoxicity, pancreatitis, gastrointestinal upset, bone marrow suppression, interstitial nephritis, interstitial pneumonitis.	Monitor with baseline CBC, then repeat weekly for 1 mon, then recheck every 1-2 mon. Onset of effects is 6 wks-3 mon. Contraindications: G6PD deficiency.
Immunomodulators					
Azathioprine (Imuran)	Maintains remission in Crohn's disease or UC; onset of effects is 3-6 mo.	2-2.5 mg/kg/day.	Cog: 0 S: 0 A: 0 Motor: 0 D: +++ Com: 0 F: 0	Reversible dose-related bone marrow suppression (leukopenia, macrocytic anemia, pancytopenia, thrombocytopenia), gastrointestinal intolerance, stomatitis, infection, drug fever, hepatotoxicity, malignancies.	Monitor with baseline CBC and AST; repeat every 2 wk for first 2 mo, then every 1-2 mo. Eliminated by kidneys; adjust dose for renal insufficiency. Reduce Imuran dose to 25% of original dose if given with allopurinol.
6-Mercaptopurine (Purinethol)	Maintains remission in Crohn's disease or UC; onset of effects may take 3-6 mo.	1-1.5 mg/kg/day.	Cog: 0 S: 0 A: 0 Motor: 0 D: ++ Com: 0 F: 0	Bone marrow toxicity, hepatotoxicity, hyperuricemia, nausea, vomiting, anorexia, intestinal ulceration, pancreatitis, skin rash.	Monitor with baseline CBC and AST; repeat every 2 wk for first 2 mo, then every 1-2 mo.
Methotrexate (Rheumatrex, Trexall)	Benefits 25%-50% of patients who fail azathioprine or 6-mercaptopurine for maintenance of remission in Crohn's or UC.	10-25 mg by mouth or intramuscularly once a wk.	Cog: 0 S: 0 A: 0 Motor: 0 D: ++ Com: 0 F: 0	Stomatitis (3%-10%), diarrhea, nausea, vomiting (up to 10%), thrombocytopenia (1%-3%), elevated liver function tests (LFTs) (up to 15%; require discontinuance if	Considered the disease-modifying antirheumatic drug of choice for initiation. Onset is 6-8 wk. Supplement with folic acid. Teratogenic. Monitor with baseline

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				LFTs are sustained at more than 2 times normal), leukopenia (rare), pulmonary fibrosis (rare), pneumonitis (rare).	urinalysis, complete blood count, and liver function tests (AST, ALT, bilirubin, albumin), hepatitis B and C testing, repeat CBC and AST and albumin every 1-2 mo.
Cyclosporine (Neoral, Sandimmune)	Reserved for use in inducing remission in patients with Crohn's disease or UC who fail more conventional therapies.	5-10 mg/kg/day. Remission occurs in 2-4 wk.	Cog: 0 S: 0 A: 0 Motor: + D: +++ Com: 0 F: 0	Hypertension (reversed on discontinuance), increased risk of infection, hyperglycemia, nephrotoxicity (reversed on discontinuance), tremor, gastrointestinal intolerances, hirsutism, gingival hyperplasia.	Monitor with baseline serum creatinine and blood pressure and repeat monthly. Onset of effects is 1-3 mo. Metabolized by the liver (active metabolites) and excreted in the bile. Drug interactions: Anticonvulsants, ketoconazole, fluconazole, trimethoprim, erythromycin, verapamil, diltiazem, nonsteroidal anti-inflammatory drugs, or cyclophosphamide.
Antibiotics					
Ciprofloxacin (Cipro)	Used to treat continued symptoms in combination with immunotherapy in mild to severe UC or Crohn's disease.	500 mg by mouth or 400 mg IV every 12 h.	Cog: ++ S: 0 A: ++ Motor: ++ D: ++ Com: + F: ++	Drug fever, rash, headache, abdominal pain, pain in the feet and extremities, dizziness, insomnia, malaise, seizures, Achilles tendon rupture or tendinitis, increased risk of arrhythmia and cardiac arrest, taste perversion, abnormal dreams, vision changes, confusion, behavior changes, hallucinations, speech disorders, arthralgias, myalgias, bone marrow suppression, dysphagia, glossitis, gastritis, nausea, vomiting, stomatitis, <i>Clostridium difficile</i> colitis, altered	Drug interactions: Avoid combining with fluvoxamine (Luvox) and duloxetine (Cymbalta); increases antidepressant levels and can cause hypertensive crisis, hypotension, syncope, and serotonin syndrome. Increases effects of warfarin (Coumadin). Decreased absorption when taken with aluminum, magnesium, calcium-containing antacids, or iron or zinc supplements. Increases caffeine, theophylline, and cyclosporine levels. Cimetidine (Tagamet) and probenecid (Benemid) increase levels. Increased seizure risk when used with foscarnet

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				coordination and gait, exacerbation of myasthenia gravis, allergic reactions, liver dysfunction, tendon rupture, renal dysfunction, Stevens-Johnson reaction.	and nonsteroidal anti-inflammatory drugs. Contraindications: Avoid use in children and pregnant women; causes tooth discoloration and cartilage abnormalities.
Metronidazole (Flagyl)	Used for continued symptoms in combination with immunotherapy in mild to severe UC or Crohn's disease.	10-20 mg/kg/day by mouth or by IV in 3-4 divided doses.	Cog: + S: + A: 0 Motor: + D: ++ Com: + F: +	Nausea, vomiting, gastrointestinal upset, metallic taste, aseptic meningitis, encephalitis, seizures, brown discoloration of urine.	Drug interactions: Disulfiram reaction occurs when used with alcohol. Increases INR when used with warfarin (Coumadin). Phenobarbital and phenytoin increase metabolism and decrease levels and effects.
Rifaximin (Xifaxan)	Used for continued symptoms in combination with immunotherapy in mild to severe UC or Crohn's disease.	600 mg by mouth/day in 3 divided doses.	Cog: + S: + A: 0 Motor: + D: ++ Com: + F: +	Peripheral edema, nausea, dizziness, fatigue, muscle spasm, abdominal pain, vertigo, dry mouth, arthralgias, confusion.	
Tumor necrosis factor-blocking agents					
Infliximab (Remicade)	Used in patients with severe UC or Crohn's disease not responsive to standard therapies.	5 mg/kg by infusion every 8 wk.	Cog: 0 S: 0 A: 0 Motor: ++ D: ++ Com: 0 F: 0	Infusion reaction with fever, chills, body aches, and headache; reduce symptoms by slowing the infusion rate and administering diphenhydramine (Benadryl), acetaminophen, and sometimes corticosteroids before infusion. Anti-infliximab antibodies occur in 10%-30% of patients, clinical SLE-like syndromes.	Use in combination with methotrexate. Onset is days to weeks. Precautions: Can reactivate latent infections such as tuberculosis or hepatitis B. Contraindications: Patients with concurrent demyelinating disease or congestive heart failure. Vaccinate prior to initiation.*
Adalimumab (Humira)	Used in patients with severe UC or Crohn's disease who do	80 mg subcutaneously, then 40 mg every 2 wk.	Cog: 0 S: 0 A: 0 Motor: +	Reactions at injection site, increased upper-respiratory tract infections,	Usual time to effect is 1-4 wk. Half-life is approximately 2 wk (range: 10-20 days) after

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	not respond to standard therapies.		D: ++ Com: 0 F: 0	bronchitis, urinary tract infection. Positive ANA titers with lupus-like disease.	a 40 mg dose. Precautions: Can reactivate latent infections such as tuberculosis or hepatitis B. Contraindications: Patients with concurrent demyelinating disease or congestive heart failure. Vaccinate prior to initiation.*
Certolizumab (Cimzia)	Used in patients with severe UC or Crohn's disease who do not respond to standard therapies.	400 mg subcutaneously at wk 0, 2, and 4 to induce remission, then 400 mg every 4 wk.	Cog: 0 S: 0 A: 0 Motor: ++ D: ++ Com: 0 F: 0	Headache, rash, cough, abdominal pain, nasopharyngitis, urinary tract infection, upper-respiratory tract infections.	Precautions: Can reactivate latent infections such as tuberculosis or hepatitis B. Contraindications: Patients with concurrent demyelinating disease or congestive heart failure. Vaccinate prior to initiation.*

*Vaccinate for pneumococcus, influenza, hepatitis, human papillomavirus, and herpes zoster 4 wk prior to initiating therapy. Cog = cognition; S = sedation; A = agitation or mania; Motor = discoordination; D = dysphagia; Com = communication; F = falls; iu = international units; CBC= complete blood count; AST = aspartate aminotransferase; ALT= alanine aminotransferase; ANA= antinuclear antibody; IV = intravenously; UC = ulcerative colitis; LFT = liver function tests; SLE = lupus; INR = international normalized ratio.

The likelihood rating scale for encountering the side effects is as follows: 0 = Almost no probability of encountering side effects + = Little likelihood of encountering side effects. +/- = Low probability of encountering side effects; however, probability increases with increased dosage. ++ = Medium likelihood of encountering side effects. +++ = High likelihood of encountering side effects, particularly with high doses. ++++ = Highest likelihood of encountering side effects; best to avoid in at-risk patients.