

Table 24.2 Medications Used to Treat Nausea and Vomiting

Medication	Indications	Dosing	Side effects affecting rehab	Other side effects and drug interactions
Substance P inhibitor: Highly effective in preventing acute and delayed nausea and vomiting with highly emetogenic chemotherapy when combined with serotonin antagonist and dexamethasone (Decadron).				
Aprepitant (Emend—oral; Fosaprepitant—IV)	Acute and delayed nausea and vomiting with highly emetogenic chemotherapy.	Emend: 125 mg before initial chemotherapy dose each cycle. Fosaprepitant: 115 mg IV before each chemotherapy dose each cycle.	Cog: ++ S: ++ A: 0 Motor: ++ D: + Com: ++ F: ++	Side effects: Fatigue ( $\leq 18\%$ ), nausea ( $\leq 13\%$ ), weakness ( $\leq 18\%$ ), hiccups (11%). Drug interactions: Emend induces CYP2C9; decreases warfarin (Coumadin) by 34% with a 14% decrease in INR and anticoagulant effects and decreases levels of dexamethasone (Decadron) and methylprednisolone (CYP3A4 substrates) by 50%. Decreases effectiveness of ethinyl estradiol and norgestimate contraceptives. Grapefruit juice (CYP3A4 inhibitor) can increase Emend levels. High-cost therapy.
Serotonin receptor antagonists: Highly effective in treating nausea and vomiting associated with chemotherapy and upper-abdominal irradiation and other causes of nausea and vomiting.				
Ondansetron (Zofran) Oral, IV	Nausea and vomiting associated with chemotherapy and upper-abdominal irradiation.	8 mg initially, 8 mg 8 h later, and then 8 mg once every 12 h, usually for maximum of 2-3 days. Administered 30 min before chemotherapy and then for up to 24 h postchemotherapy. Oral dose is the same as IV dose.	Cog: + S: + A: 0 Motor: ++ D: + Com: + F: ++	Side effects: Constipation, insomnia, diarrhea, dizziness, headache, arrhythmia with QT prolongation, dystonia, EPS arthralgias, depression. Drug interactions: Can increase QT prolongation and arrhythmias when combined with other agents that prolong the QT such as antiarrhythmics, tricyclic antidepressants, thioridazine (Mellaril), mesoridazine (Serentil), ziprasidone (Geodon), anesthetics, and medications that cause loss of potassium or magnesium.
Granisetron (Kytril) Oral, IV, transdermal patch	Nausea and vomiting associated with chemotherapy and upper-abdominal irradiation.	2 mg within 1 h of chemotherapy or radiation or 1 mg 1 h before treatment and then repeated in 12 h. Oral dose is the same as IV dose. Transdermal patch provides 3.1 mg/24 h and may be worn for up to 7 days to provide antiemetic therapy; should be worn until 24 h after completion of chemotherapy.	Cog: + S: + A: 0 Motor: ++ D: + Com: + F: ++	Side effects: Constipation, insomnia, diarrhea, dizziness, headache, arrhythmia with QT prolongation, dystonia, EPS, arthralgias, depression. Drug interactions: Can increase QT prolongation and arrhythmias when combined with other agents that prolong the QT such as antiarrhythmics, tricyclic antidepressants, thioridazine (Mellaril), mesoridazine (Serentil), ziprasidone (Geodon), anesthetics, and medications that cause loss of potassium or magnesium.
Dolasetron (Anzemet) IV	Nausea and vomiting associated with	Adults: 100 mg by mouth or IV within 1 h of chemotherapy.	Cog: + S: + A: 0	Side effects: Constipation, insomnia, diarrhea, dizziness, headache, arrhythmia with QT prolongation, dystonia, EPS,

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	chemotherapy and upper-abdominal irradiation.	Children: 1.8 mg/kg within 1 h of chemotherapy.	Motor: ++ D: + Com: + F: ++	arthralgias, depression. Drug interactions: Can increase QT prolongation and arrhythmias when combined with other agents that prolong the QT such as antiarrhythmics, tricyclic antidepressants, thioridazine (Mellaril), mesoridazine (Serentil), ziprasidone (Geodon), anesthetics, and medications that cause loss of potassium or magnesium.
Palonosetron (Aloxi) IV	Nausea and vomiting associated with chemotherapy and upper-abdominal irradiation.	0.25 mg IV on day 1 of each chemotherapy cycle. Half-life is 40 h.	Cog: + S: + A: 0 Motor: ++ D: + Com: + F: ++	Side effects: Constipation, insomnia, diarrhea, dizziness, headache, arrhythmia with QT prolongation, dystonia, EPS, arthralgias, depression. Drug interactions: Can increase QT prolongation and arrhythmias when combined with other agents that prolong the QT such as antiarrhythmics, tricyclic antidepressants, thioridazine (Mellaril), mesoridazine (Serentil), ziprasidone (Geodon), anesthetics, and medications that cause loss of potassium or magnesium.
Benzodiazepines: Provide effective preventative therapy for anticipatory nausea and vomiting.				
Lorazepam (Ativan) Oral, IV	Anticipatory nausea and vomiting.	0.5-2 mg by mouth 60 min before chemotherapy or by IV 10 min before chemotherapy. Repeat every 6 h as needed.	Cog: +++ S: +++ A: 0 Motor: ++ D: ++ Com: ++ F: ++	Side effects: Sedation, confusion, hypotension, ataxia, dysphagia, dry mouth. Drug interactions: Enhanced sedative effects when used with some antidepressants, antiepileptic drugs (e.g., phenobarbital, phenytoin, carbamazepine), sedative antihistamines, opiates, antipsychotics, or alcohol.
Alprazolam (Xanax) Oral	Anticipatory nausea and vomiting.	0.25-0.5 mg by mouth 60 min before chemotherapy. Repeat every 6 h as needed.	Cog: + S: + A: 0 Motor: ++ D: 0/+ Com: + F: +	Side effects: Sedation, confusion, hypotension, ataxia, dysphagia, dry mouth. Drug interactions: Enhanced sedative effects when used with some antidepressants, antiepileptic drugs (e.g., phenobarbital, phenytoin, carbamazepine), sedative antihistamines, opiates, antipsychotics, or alcohol.
Glucocorticoids: Steroids are used in combination with a serotonin antagonist before each dose of chemotherapy. May be useful in treating delayed and refractory nausea and vomiting; also used to treat nausea in patients with disseminated cancer by suppressing inflammation and prostaglandin production caused by tumor encroachment.				

Medication	Indications	Dosing	Side effects affecting rehab	Other side effects and drug interactions
Dexamethasone (Decadron) IV, oral Prednisone Oral	Delayed and refractory nausea and vomiting; nausea in patients with disseminated cancer.	4-8 mg IV along with serotonin antagonist before each dose of chemotherapy.	Cog: + S: 0 A: + Motor: + D: + Com: + F: +	Side effects: Personality changes, insomnia, euphoria, muscle weakness or wasting, thinning of the skin, glaucoma, hyperglycemia, cataracts, depressed immune function, lipodystrophy (moon facies, truncal obesity). Drug interactions: Avoid abrupt discontinuation of long-term or high-dose oral therapy to avoid severe depression and acute adrenal insufficiency. Drug interactions can antagonize glycemic control of antidiabetic agents.
<b>Cannabinoid</b>				
Dronabinol (Marinol) Oral	Derivative of marijuana used to treat nausea in cancer patients in which other agents have failed.	5 mg/m <sup>2</sup> immediately before chemotherapy and then every 2-4 h as needed. Maximum of 6 doses/day.	Cog: ++ S: ++ A: 0 Motor: ++ D: + Com: ++ F: ++	Side effects: Sedation, confusion, hypotension, ataxia, dry mouth. Drug interactions: Enhanced sedative effects when used with other central nervous system depressants or alcohol. Most effective in patients with previous positive experiences with marijuana.
<b>Dopamine antagonist antiemetic</b>				
Metoclopramide (Reglan) Oral, IV	Rescue antiemetic in chemotherapy patients; treats postoperative and other causes of nausea and vomiting. Has additional prokinetic activity associated with effects on muscarinic receptors.	10 mg by mouth or IV every 6 h as needed.	Cog: +++ S: +++ A: ++ Motor: +++ D: + Com: +++ F: +++	Common side effects: Restlessness, drowsiness, dizziness, lassitude, dystonia. Infrequent side effects: Headache, extrapyramidal effects such as oculogyric crisis, hypotension, hypertension, hyperprolactinemia leading to galactorrhea, constipation, depression. Drug interactions: Additive sedation when used with other central nervous system depressants. Antagonizes dopamine-enhancer therapy used in treatment of Parkinson's disease.
<b>Phenothiazine antiemetics:</b> Phenothiazine agents that are dopamine antagonists; used as rescue antiemetics in chemotherapy patients. Useful in treating postoperative nausea and vomiting, motion sickness, and other causes of nausea and vomiting due to additional effects on the muscarinic receptors.				
Promethazine (Phenergan) IM	Rescue antiemetic in chemotherapy patients; treats postoperative and other causes of nausea and vomiting.	25 mg by mouth or IM every 6 h as needed (IV administration contraindicated).	Cog: +++ S: +++ A: ++ Motor: +++ D: ++ Com: +++ F: +++	Side effects: Strong sedative and anticholinergic effects, dry mouth and throat, increased heart rate, pupil dilation, urinary retention, constipation. At high doses: Hallucinations or delirium, motor impairment (ataxia as well as extrapyramidal side effects), flushed skin, blurred vision, abnormal sensitivity to bright light (photophobia), difficulty concentrating, short-term memory loss, visual disturbances, irregular breathing, dizziness, irritability, itchy

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				skin, confusion, decreased body temperature (generally in the hands or feet), erectile dysfunction, excitability. Drug interactions: Additive sedation when used with other central nervous system depressants. Antagonizes dopamine-enhancer therapy used in treatment of Parkinson's disease.
Prochlorperazine (Compazine) IV	Rescue antiemetic in chemotherapy patients; treats postoperative and other causes of nausea and vomiting.	25 mg by mouth or 10 mg IV every 6 h as needed.	Cog: +++ S: +++ A: ++ Motor: +++ D: ++ Com: +++ F: +++	Side effects: Strong sedative and anticholinergic effects, dry mouth and throat, increased heart rate, pupil dilation, urinary retention, constipation. At high doses: Hallucinations or delirium, motor impairment (ataxia), flushed skin, blurred vision, abnormal sensitivity to bright light (photophobia), difficulty concentrating, short-term memory loss, visual disturbances, irregular breathing, dizziness, irritability, itchy skin, confusion, decreased body temperature (generally in the hands or feet), erectile dysfunction, excitability. Drug interactions: Additive sedation when used with other central nervous system depressants. Antagonizes dopamine-enhancer therapy used in treatment of Parkinson's disease.
Histamine-1 receptor antagonist (antihistamine) antiemetics: Used as rescue antiemetic and to treat delayed nausea and vomiting associated with chemotherapy. Useful in treating postoperative nausea and vomiting, motion sickness, and other causes of nausea and vomiting due to additional effects on the muscarinic receptors.				
Hydroxyzine (Vistaril) Oral, IV	Rescue antiemetic for delayed nausea and vomiting associated with chemotherapy; treats postoperative nausea and vomiting and other causes of nausea and vomiting, especially vestibular effects.	25-50 mg by mouth or IM every 6 h as needed.	Cog: ++ S: ++ A: + Motor: ++ D: ++ Com: ++ F: ++	Side effects: Strong sedative and anticholinergic effects, dry mouth and throat, increased heart rate, pupil dilation, urinary retention, constipation. At high doses: Hallucinations or delirium, motor impairment (ataxia), flushed skin, blurred vision, abnormal sensitivity to bright light (photophobia), difficulty concentrating, short-term memory loss, visual disturbances, irregular breathing, dizziness, irritability, itchy skin, confusion, decreased body temperature (generally in the hands or feet), erectile dysfunction, excitability. Drug interactions: Additive sedation when used with other central nervous system depressants. Antagonizes dopamine-enhancer therapy used in treatment of Parkinson's disease.

Medication	Indications	Dosing	Side effects affecting rehab	Other side effects and drug interactions
Diphenhydramine (Benadryl) Oral, IV	Rescue antiemetic for delayed nausea and vomiting associated with chemotherapy; treats postoperative nausea and vomiting and other causes of nausea and vomiting, especially vestibular effects.	25-50 mg by mouth or IV every 6 h as needed.	Cog: +++ S: +++ A: + Motor: +++ D: +++ Com: +++ F: +++	Side effects: Strong sedative and anticholinergic effects, dry mouth and throat, increased heart rate, pupil dilation, urinary retention, constipation. At high doses: Hallucinations or delirium, motor impairment (ataxia), flushed skin, blurred vision, abnormal sensitivity to bright light (photophobia), difficulty concentrating, short-term memory loss, visual disturbances, irregular breathing, dizziness, irritability, itchy skin, confusion, decreased body temperature (generally in the hands or feet), erectile dysfunction, excitability. Drug interactions: Additive sedation when used with other central nervous system depressants. Antagonizes dopamine-enhancer therapy used in treatment of Parkinson's disease. Often used to treat allergic reactions.
Meclizine (Antivert) Oral	Rescue antiemetic for delayed nausea and vomiting associated with chemotherapy; treats postoperative nausea and vomiting and other causes of nausea and vomiting, especially vestibular effects.	25 mg by mouth every 6 h as needed.	Cog: ++ S: ++ A: + Motor: ++ D: ++ Com: ++ F: ++	Side effects: Strong sedative and anticholinergic effects, dry mouth and throat, increased heart rate, pupil dilation, urinary retention, constipation. At high doses: Hallucinations or delirium, motor impairment (ataxia), flushed skin, blurred vision, abnormal sensitivity to bright light (photophobia), difficulty concentrating, short-term memory loss, visual disturbances, irregular breathing, dizziness, irritability, itchy skin, confusion, decreased body temperature (generally in the hands or feet), erectile dysfunction, excitability. Drug interactions: Additive sedation when used with other central nervous system depressants. Antagonizes dopamine-enhancer therapy used in treatment of Parkinson's disease.
Scopolamine (Hyoscine, Transderm Scop patch) IM	Rescue antiemetic for delayed nausea and vomiting associated with chemotherapy; treats postoperative nausea and vomiting and other causes of nausea and vomiting, especially vestibular	0.4 mg IM or apply 1.5 mg patch every 3 days.	Cog: ++ S: ++ A: + Motor: ++ D: ++ Com: ++ F: ++	Side effects: Strong sedative and anticholinergic effects, dry mouth and throat, increased heart rate, pupil dilation, urinary retention, constipation. At high doses: Hallucinations or delirium, motor impairment (ataxia), flushed skin, blurred vision, abnormal sensitivity to bright light (photophobia), difficulty concentrating, short-term memory loss, visual disturbances, irregular breathing, dizziness, irritability, itchy skin, confusion, decreased body temperature (generally in the hands or feet), erectile dysfunction, excitability. Drug interactions: Additive sedation when used with other central nervous system

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	effects.			depressants. Antagonizes dopamine-enhancer therapy used in treatment of Parkinson's disease.

Cog = cognition; S = sedation; A = agitation or mania; Motor = discoordination; D = dysphagia; Com = communication; F = falls; EPS= extrapyramidal symptoms; INR= international normalized ratio; IM = intramuscularly; IV = intravenously.

The likelihood rating scale for encountering the side effects is as follows: 0 = Almost no probability of encountering side effects. 0/+ = Slight probability of encountering side effects with higher doses. + = 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.