

Table 19.7 Classes of Antiarrhythmic Medications

Medication	Indications	Dosing	Side effects affecting rehab	Other side effects or considerations
Type 1a: Sodium channel blockers				
Quinidine (Quinaglute)	Used to maintain sinus rhythm in patients with supraventricular tachycardia and prevent recurrence of ventricular arrhythmia.	324 mg by mouth 3 times/day (every 8 h). Adjust dose based on quinidine levels.	Cog: ++ S: 0 A: ++ Motor: + D: ++ Com: ++ F: ++	Diarrhea in up to 50%, cinchonism (headache and tinnitus seen with elevated levels), confusion, blurred vision. Drug interactions: Quinidine is a CYP2D6 inhibitor; it reduces clearance of digoxin and propafenone and decreases metabolism and therapeutic levels and effects of codeine. Phenytoin, rifampin, and phenobarbital may decrease quinidine levels and effects. Quinidine toxicity is increased when taken with ritonavir, beta blockers, amiodarone, verapamil, cimetidine, alkalinizing agents, or nondepolarizing or depolarizing muscle relaxants. Quinidine may enhance effect of warfarin (Coumadin).
Procainamide (Pronestyl—long acting)	Used to maintain sinus rhythm in patients with supraventricular tachycardia and prevent recurrence of ventricular arrhythmia.	1000 mg by mouth twice/day (every 12 h). Adjust dose based on levels of procainamide and its active metabolite NAPA.	Cog: ++ S: 0 A: ++ Motor: ++ D: ++ Com: ++ F: ++	Lupus-like syndrome, anemia, neutropenia, agranulocytosis, allergy, rash, nausea, vomiting, diarrhea, taste changes, elevated liver enzyme, hepatomegaly (rare), dizziness, giddiness, mental depression, psychosis (rare); hypotension, cardiac arrhythmia, and heart block after IV administration. Drug interactions: Increased levels of the active metabolite NAPA in patients taking cimetidine, ranitidine, beta blockers, amiodarone, trimethoprim, or quinidine. May increase effect of skeletal muscle relaxants (e.g., quinidine, lidocaine) and neuromuscular blockers. Ofloxacin inhibits tubular secretion and may increase levels and effects of procainamide.
Disopyramide (Norpace)	Used to maintain sinus rhythm in patients with supraventricular tachycardia and prevent recurrence of ventricular arrhythmia.	150 mg every 6 h. Extended release: 300 mg twice/day. Decrease interval with renal insufficiency.	Cog: ++ S: ++ A: 0 Motor: +++ D: ++ Com: ++ F: +++	Dry mouth, urinary hesitancy, constipation, blurred vision, urinary retention, nausea, bloating, flatulence, dizziness, fatigue, muscle weakness, headache, malaise, muscle pain. Drug interactions: Do not administer within 48 h before or 24 h after verapamil. Cases of life-threatening interactions have been reported when given with clarithromycin and erythromycin; administering disopyramide with cytochrome 3A4 inhibitors could result in potentially fatal interaction.
Type 1b: Sodium channel blockers				
Lidocaine (Xylocaine)	Ventricular arrhythmias (premature ventricular contractions, ventricular tachycardia).	1-1.5 mg/kg by IV bolus, then continuous IV infusion of 1-4 mg/min titrated to control	Cog: ++ S: ++ A: 0 Motor: ++ D: + Com: ++ F: ++	Disorientation, confusion, dizziness, respiratory depression. Drug interactions: Coadministration with cimetidine or beta blockers increases toxicity. Coadministration with procainamide and tocainide may result in additive cardiodepressant action. May increase effects of succinylcholine.

From L. Carl, J. Gallo, and P. Johnson, 2014, *Practical Pharmacology in Rehabilitation: Effect of Medication on Therapy* (Champaign, IL: Human Kinetics).

Medication	Indications	Dosing	Side effects affecting rehab	Other side effects or considerations
		arrhythmia	Not used in rehab.	
Mexiletine (Mexitil)	Ventricular arrhythmias (premature ventricular contractions, ventricular tachycardia).	Start at 150 mg by mouth every 8 h; may titrate to 300-450 by mouth every 8 h.	Cog: ++ S: + A: + Motor: +++ D: ++ Com: + F: ++	Blurred vision, clumsiness, constipation, diarrhea, dizziness or lightheadedness, headache, heartburn, incoordination, nausea, nervousness, tremor, vomiting. Drug interactions: Decreased levels when used with aluminum–magnesium hydroxide compounds, atropine, narcotics, hydantoins, rifampin, or urinary acidifiers. Metoclopramide and urinary alkalinizers increase levels. Cimetidine can either increase or decrease levels. Increases levels of caffeine and theophylline.
Tocainide (Tonocard)	Ventricular arrhythmias (premature ventricular contractions, ventricular tachycardia).	400 mg every 8 h.	Cog: ++ S: + A: + Motor: +++ D: ++ Com: + F: ++	Nausea, vomiting, dizziness, vertigo, paresthesias, tremor, confusion, arrhythmia, agranulocytosis (rare), pulmonary fibrosis, respiratory arrest, skin rash. No drug interactions identified.
Type 1c: Sodium channel blockers				
Flecainide (Tambocor)	Maintains sinus rhythm in patients with supraventricular tachycardia.	50 mg by mouth every 12 h; increase as needed every 4 days to maximum dose of 300 mg/day. As little as 50 mg by mouth every 12 h may be effective in children and adults.	Cog: ++ S: + A: + Motor: +++ D: ++ Com: + F: ++	Dizziness, visual disturbances, dyspnea, headache, nausea, fatigue, palpitations, chest pain, asthenia, tremor, constipation, edema, abdominal pain. Drug interactions: May increase toxicity of digoxin. Beta-adrenergic blockers, verapamil, and disopyramide may have additive inotropic effects when administered with flecainide. CYP4502D6 inhibitors (e.g., ritonavir, cimetidine, amiodarone) may increase flecainide levels and cardiotoxicity.
Propafenone (Rythmol)	Maintains sinus rhythm in patients with supraventricular tachycardia.	150 mg by mouth every 8 h; and may titrate every 3-4 days as needed to maximum dose of 300 mg every 8 h.	Cog: + S: 0 A: 0 Motor: ++ D: 0 Com: 0 F: ++	Hypotension, bradycardia, torsades de pointes. Drug interactions: Rifampin may decrease plasma levels. Quinidine may increase Rythmol's effects. May increase levels of beta blockers, cyclosporine, warfarin, and digoxin. CYP2D6 inhibitors (e.g., ritonavir, cimetidine, amiodarone) may increase Rythmol's levels and toxicity.
Type II: Beta blockers: Reduce sympathetic tone, myocardial oxygen demand, ischemia, heart rate, and blood pressure. See table 19.2.				
Type III: Potassium channel blockers: Used to treat ventricular arrhythmia.				
Amiodarone (Cordarone)	Maintains sinus rhythm in	Oral loading dose is	Cog: + S: 0	Pulmonary fibrosis, hypothyroidism, corneal microdeposits, elevated liver enzymes, hepatitis

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Medication	Indications	Dosing	Side effects affecting rehab	Other side effects or considerations
Pacerone)	patients with atrial fibrillation.	generally 200 mg twice daily which is followed by 200 mg once daily.	A: 0 Motor: + D: 0 Com: 0 F: +	(rare), jaundice, blue-gray discoloration of skin. Increases effect and blood levels of theophylline, quinidine, procainamide, phenytoin, methotrexate, flecainide, digoxin, cyclosporine, beta blockers, and anticoagulants. Ritonavir and disopyramide increase cardiotoxicity. Coadministration with calcium channel blockers may cause an additive effect and further decrease myocardial contractility. Cimetidine may increase levels. Protease inhibitors (e.g., indinavir, ritonavir, amprenavir, nelfinavir) inhibit metabolism, resulting in increased serum levels and possible prolongation of QT interval.
Bretylium (Bretylol)	Administered IV in code situation.	Limited use in current practice.	Cog: + S: 0 A: 0 Motor: ++ D: 0 Com: 0 F: ++	Hypertension followed by hypotension, ventricular ectopy. Drug interactions: Digitalis toxicity may be aggravated by the initial release of norepinephrine caused by bretylium. Enhances the pressor effects of catecholamines (e.g., dopamine, norepinephrine).
Dofetilide (Tikosyn)	Maintains sinus rhythm in patients with atrial fibrillation.	125-500 mg every 12 h. Adjust dose for renal insufficiency.	Cog: 0 S: 0 A: 0 Motor: ++ D: 0 Com: 0 F: ++	Bradycardia, headache, chest pain, dizziness, torsades de pointes. Drug interactions: Avoid concurrent use of thiazide diuretics verapamil, cimetidine, trimethoprim (alone or in combination with sulfamethoxazole), or ketoconazole; each of these drugs causes a substantial increase in Tikosyn levels. Do not use with other known inhibitors of renal cation transport (e.g., prochlorperazine, megestrol).
Dronedarone (Multaq)	Maintains sinus rhythm in patients with atrial fibrillation.	400 mg every 12 h with food.	Cog: + S: 0 A: 0 Motor: ++ D: + Com: 0 F: ++	Diarrhea, nausea, bradycardia, torsades de pointes. Drug interactions: Increased risk of torsades de pointes when used with drugs that prolong QT interval (e.g., certain phenothiazines, tricyclic antidepressants, macrolide antibiotics, class I and III antiarrhythmics). Concurrent use of digoxin, verapamil, diltiazem, or beta blockers potentiates Multaq's effects. Avoid concurrent use of ketoconazole as well as other potent CYP3A inhibitors (e.g., itraconazole, voriconazole, ritonavir, clarithromycin, and nefazodone). Grapefruit juice is contraindicated. Rifampin or other CYP3A inducers (e.g., phenobarbital, carbamazepine, phenytoin, St. John's wort) decrease levels and effects of Multaq. Verapamil and diltiazem are moderate CYP3A inhibitors and increase Multaq levels 1.4- to 1.7-fold. Multaq increases simvastatin levels 2- to 3-fold;

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				increases verapamil, diltiazem, or nifedipine levels by 50%; and increases digoxin levels 2.5-fold. Can increase plasma concentrations of tacrolimus, sirolimus, beta blockers, tricyclic antidepressants, and selective serotonin reuptake inhibitors.
Sotalol (Betapace)	Ventricular tachyarrhythmia, atrial fibrillation and flutter; maintains sinus rhythm in patients with atrial fibrillation.	Start at 80 mg every 12 h and increase to 240-320 mg/d in 2-3 divided doses. Adjust dose for renal insufficiency.	Cog: ++ S: ++ A: 0 Motor: ++ D: + Com: ++ F: ++	Fatigue, dizziness, bradycardia, asthenia. Drug interactions: Aluminum salts, barbiturates, nonsteroidal anti-inflammatory drugs, penicillins, calcium salts, cholestyramine, and rifampin may decrease bioavailability and plasma levels, possibly resulting in decreased pharmacologic effect. May increase cardiotoxicity when used with calcium channel blockers, quinidine, flecainide, or contraceptives. Increased toxicity when used with digoxin, flecainide, acetaminophen, clonidine, epinephrine, nifedipine, prazosin, haloperidol, phenothiazines, or catecholamine-depleting agents.
Ibutilide (Corvert)	Chemical cardioversion of atrial fibrillation.	1 mg via IV infusion to convert patients to normal sinus rhythm. May repeat once if cardioversion is not successful.	Cog: + S: 0 A: 0 Motor: + D: + Com: 0 F: +	Arrhythmia, nausea. Drug interactions: No drug interactions identified.
Type IV: Calcium channel blockers				
Verapamil (Calan, Calan SR, Isoptin, Isoptin SR, Covera-HS)	Used in management of atrial fibrillation.	80-160 mg by mouth every 8 h. Sustained release formulations may be once-daily dose	Cog: + S: 0 A: 0 Motor: ++ D: + Com: 0 F: ++	Bradycardia, nausea, peripheral edema, hypotension. Increased risk of falls from orthostasis. Verapamil is associated with severe constipation; use laxative with this medication. Food interactions: Grapefruit juice (>200 ml) can increase levels of these medications and should not be consumed within 2 hrs before or 4 hrs after administration.
Diltiazem (Cardizem, Cardizem CD, Dilator SR)	Used in management of atrial fibrillation.	Cardizem SR: 60-120 mg by mouth twice/day. Cardizem CD: 180-240 mg by mouth/day. Dilator: 180-240 mg by mouth/day.	Cog: + S: 0 A: 0 Motor: ++ D: + Com: 0 F: ++	Drug interactions: Decreases liver metabolism of carbamazepine (Tegretol), digoxin, and cyclosporine levels. May decrease metabolism and increase levels of simvastatin (Zocor), atorvastatin (Lipitor), and lovastatin (Mevacor) that can result in rhabdomyolysis or liver toxicity. Coadministration with amiodarone can cause bradycardia and decrease cardiac output. May increase cardiac depression when used with beta blockers. Cimetidine may increase levels. May increase theophylline levels.

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Cog = cognition; S = sedation; A = agitation or mania; Motor = discoordination; D = dysphagia; Com = communication; F = falls; IV = intravenously; NAPA = N-acetylprocainamide.

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.