BEERS LIST: POTENTIALLY INAPPROPRIATE DRUGS FOR ELDERLY (Part 1 of 3)

Alprazolam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Amiodarone (data suggest that rate control yields better balance of benefits and harms than rhythm control for most older adults)

Amitriptyline (highly anticholinergic, sedating, and cause orthostatic hypotension)

Amobarbital (high rate of physical dependence; tolerance to sleep benefits; risk of overdose at low dosages)

Aripiprazole (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Asenapine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Aspirin (>325mg/d) (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Belladonna alkaloids (highly anticholinergic, uncertain effectiveness)

Benztropine (oral) (not recommended for prevention of extrapyramidal symptoms with antipsychotics; more-effective agents available for treatment of Parkinson disease)

Brompheniramine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Butabarbital (high rate of physical dependence; tolerance to sleep benefits; risk of overdose at low dosages)

Butalbital (high rate of physical dependence; tolerance to sleep benefits; risk of overdose at low dosages)

Carbinoxamine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Carisoprodol (most muscle relaxants are poorly tolerated by older adults because of anticholinergic adverse effects, sedation, risk of fracture)

Chloral hydrate (tolerance occurs within 10 days, and risks outweigh benefits in light of overdose with doses only 3 times the recommended dose)

Chlorazepate (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Chlordiazepoxide (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Chlordiazepoxide-amitryptyline (highly anticholinergic, sedating, and cause orthostatic hypotension)

Chlorpheniramine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Chlorpromazine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Chlorpropamide (prolonged half-life in older adults; can cause prolonged hypoglycemia; causes syndrome of inappropriate antidiuretic hormone secretion)

Chlorzoxazone (most muscle relaxants are poorly tolerated by older adults because of anticholinergic adverse effects, sedation, risk of fracture)

Clemastine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Clidinium-chlordiazepoxide (highly anticholinergic, uncertain effectiveness)

Clomipramine (highly anticholinergic, sedating, and cause orthostatic hypotension)

Clonazepam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Clonidine (high risk of adverse CNS effects; may cause bradycardia and orthostatic hypotension; not recommended as routine treatment for hypertension)

Clozapine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Cyclobenzaprine (most muscle relaxants are poorly tolerated by older adults because of anticholinergic adverse effects, sedation, risk of fracture)

Cyproheptadine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Dessicated thyroid (concerns about cardiac effects; safer alternatives available)

Dexbrompheniramine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Dexchlorpheniramine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Diazepam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Diclofenac (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Dicyclomine (highly anticholinergic, uncertain effectiveness)

Diflunisal (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Digoxin (>0.125mg/d) (in heart failure, higher dosages associated with no additional benefit and may increase risk of toxicity; slow renal clearance may lead to risk of toxic effects)

Diphenhydramine (oral) (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Dipyridamole (oral short acting [does not apply to extended-release combination with aspirin]) (may cause orthostatic hypotension; more effective alternatives available; intravenous form acceptable for use in cardiac stress testing)

Disopyramide (a potent negative inotrope and therefore may induce heart failure in older adults; strongly anticholinergic; other antiarrhythmic drugs preferred)

Dofetilide (data suggest that rate control yields better balance of benefits and harms than rhythm control for most older adults)

Doxazosin (high risk of orthostatic hypotension; not recommended as routine treatment for hypertension; alternative agents have superior risk/benefit profile)

Doxepin (>6mg/d) (highly anticholinergic, sedating, and cause orthostatic hypotension)

(continued)

BEERS LIST: POTENTIALLY INAPPROPRIATE DRUGS FOR ELDERLY (Part 2 of 3)

Doxylamine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Dronedarone (worse outcomes have been reported in patients taking dronedarone who have permanent atrial fibrillation or heart failure)

Ergot mesylates (lack of efficacy)

Estazolam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Estrogens with or without progestins (evidence of carcinogenic potential [breast and endometrium]; lack of cardioprotective effect and cognitive protection in older women)

Eszopiclone (adverse effects similar to those of benzodiazepines (eg, delirium, falls, fractures); minimal improvement in sleep latency and duration)

Etodolac (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Fenoprofen (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Flecainide (data suggest that rate control yields better balance of benefits and harms than rhythm control for most older adults)

Fluphenazine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Flurazepam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Glyburide (greater risk of severe prolonged hypoglycemia in older adults)

Growth hormone (effect of body composition is small and associated with edema, arthralgia, carpal tunnel syndrome, gynecomastia, impaired fasting glucose)

Guanabenz (high risk of adverse CNS effects; may cause bradycardia and orthostatic hypotension; not recommended as routine treatment for hypertension)

Guanfacine (high risk of adverse CNS effects; may cause bradycardia and orthostatic hypotension; not recommended as routine treatment for hypertension)

Haloperidol (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Hydroxyzine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Hyoscyamine (highly anticholinergic, uncertain effectiveness)

Ibuprofen (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Ibutilide (data suggest that rate control yields better balance of benefits and harms than rhythm control for most older adults)

Iloperidone (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Imipramine (highly anticholinergic, sedating, and cause orthostatic hypotension)

Indomethacin (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Insulin (sliding scale) (higher risk of hypoglycemia without improvement in hyperglycemia management regardless of care setting)

Isoxsuprine (lack of efficacy)

Ketoprofen (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Ketorolac (includes parenteral) (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Lorazepam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Loxapine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Lurasidone (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Meclofenamate (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Mefenamic acid (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Megestrol (minimal effect on weight; increases risk of thrombotic events and possibly death in older adults)

Meloxicam (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Meperidine (not an effective oral analgesic in dosages commonly used; may cause neurotoxicity; safer alternatives available)

Mephobarbital (high rate of physical dependence; tolerance to sleep benefits; risk of overdose at low dosages)

Meprobamate (high rate of physical dependence; very sedating)

Mesoridazine (highly anticholinergic and risk of QT-interval prolongation)

Metaxalone (most muscle relaxants are poorly tolerated by older adults because of anticholinergic adverse effects, sedation, risk of fracture)

Methocarbamol (most muscle relaxants are poorly tolerated by older adults because of anticholinergic adverse effects, sedation, risk of fracture)

Methyldopa (high risk of adverse CNS effects; may cause bradycardia and orthostatic hypotension; not recommended as routine treatment for hypertension)

Methyltestosterone (potental for cardiac problems and contraindicated in men with prostate cancer)

Metoclopramide (can cause extrapyramidal effects including tardive dyskinesia; risk may be even greater in frail older adults)

Mineral oil (oral) (potential for aspiration and adverse effects; safer alternatives available)

Molindone (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Nabumetone (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Naproxen (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

(continued)

BEERS LIST: POTENTIALLY INAPPROPRIATE DRUGS FOR ELDERLY (Part 3 of 3)

Nifedipine (immediate release) (potential for hypotension; risk of precipitating myocardial ischemia)

Nitrofurantoin (potential for pulmonary toxicity; safer alternatives available; lack of efficacy in patients with CrCl<60mL/min due to inadequate drug concentration in the urine)

Olanzapine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Orphenadrine (most muscle relaxants are poorly tolerated by older adults because of anticholinergic adverse effects, sedation, risk of fracture)

Oxaprozin (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Oxazepam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Paliperidone (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Pentazocine (opioid analgesic that causes CNS adverse effects, including confusion and hallucinations, more commonly than other narcotic drugs)

Pentobarbital (high rate of physical dependence; tolerance to sleep benefits; risk of overdose at low dosages)

Perphenazine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Perphenazine-amitriptyline (highly anticholinergic, sedating, and cause orthostatic hypotension)

Phenobarbital (high rate of physical dependence; tolerance to sleep benefits; risk of overdose at low dosages)

Pimozide (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Piroxicam (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Prazosin (high risk of orthostatic hypotension; not recommended as routine treatment for hypertension; alternative agents have superior risk/benefit profile)

Procainamide (data suggest that rate control yields better balance of benefits and harms than rhythm control for most older adults)

Promazine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Promethazine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Propafenone (data suggest that rate control yields better balance of benefits and harms than rhythm control for most older adults)

Propantheline (highly anticholinergic, uncertain effectiveness)

Quazepam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Quetiapine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Quinidine (data suggest that rate control yields better balance of benefits and harms than rhythm control for most older adults)

Reserpine (>0.1mg/d) (high risk of adverse CNS effects; may cause bradycardia and orthostatic hypotension; not recommended as routine treatment for hypertension)

Risperidone (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Scopolamine (highly anticholinergic, uncertain effectiveness)

Secobarbital (high rate of physical dependence; tolerance to sleep benefits; risk of overdose at low dosages)

Sotalol (data suggest that rate control yields better balance of benefits and harms than rhythm control for most older adults)

Spironolactone (>25mg/d) (in heart failure, the risk of hyperkalemia is higher in older adults, esp. if taking >25mg/d or taking concomitant NSAID, ACE inhibitor, ARB, or K+ supplement)

Sulindac (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Temazepam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Terazosin (high risk of orthostatic hypotension; not recommended as routine treatment for hypertension; alternative agents have superior risk/benefit profile)

Testosterone (potental for cardiac problems and contraindicated in men with prostate cancer)

Thioridazine (highly anticholinergic and risk of QT-interval prolongation)

Thiothixene (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Ticlopidine (safer effective alternatives available)

Tolmetin (increases risk of GI bleeding and peptic ulcer disease in high-risk groups, including those aged >75 or taking corticosteroids or anticoagulants)

Triazolam (increased sensitivity to benzodiazepines. Increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults)

Trifluoperazine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Triflupromazine (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Trihexyphenidyl (not recommended for prevention of extrapyramidal symptoms with antipsychotics; more-effective agents available for treatment of Parkinson disease)

Trimethobenzamide (one of the least effective antiemetic drugs; can cause extrapyramidal adverse effects)

Trimipramine (highly anticholinergic, sedating, and cause orthostatic hypotension)

Triprolidine (highly anticholinergic; clearance reduced with advanced age, and tolerance when used as hypnotic; risk of confusion, dry mouth, constipation)

Zaleplon (adverse effects similar to those of benzodiazepines (eg, delirium, falls, fractures); minimal improvement in sleep latency and duration)

Ziprasidone (increased risk of cerebrovascular accident [stroke] and mortality in persons with dementia)

Zolpidem (adverse effects similar to those of benzodiazepines (eg, delirium, falls, fractures); minimal improvement in sleep latency and duration)

REFERENCES

Adapted from: American Geriatrics Society Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults. (Table 2). The American Geriatrics Society 2012 Beers Criteria Update Expert Panel. *J Am Geriatr Soc.* 2012;60:616-631.

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