Finding Balance

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FOR HEALTH PRACTITIONERS | Medications and the Risk of Falling

Drug effects that increase the risk of falls and injury:

- Drowsiness
- Dizziness
- Hypoglycemia
- Hypotension, especially orthostatic hypotension
- Parkinsonian effects
- Ataxia/gait disturbance
- Vision disturbance
- Delirium
- Cognitive impairment
- Low potassium

ANY drug that causes the following effects can increase the risk of a severe injury due to a fall:

- Osteoporosis or reduced bone mineral density: Increased risk of fracture
- Bleeding risk: Increased risk of a hemorrhage

ALERT!

- *The more drugs, the higher the risk*
- *Older adults may have altered pharmacokinetics (i.e. reduced renal function) resulting in an increased risk for adverse drug reactions and possibly drug accumulation*

Assessment of patient risk:

- ☐ **Has the patient had a slip, trip, near fall or fall in the last 6 months?**
- ☐ Is the patient **taking a drug that can cause any of the effects listed above? (see list of drugs on next page)**
- ☐ Is the patient taking a **high dose of the drug?**
- ☐ Is this **the first time** that the patient has taken this drug(s)?
- ☐ Is the patient **displaying any of the adverse effects listed above**, such as drowsiness/dizziness?
- ☐ Is the patient **taking more than one drug that increases their falls risk?**
- ☐ Is the patient **at risk of falling for other, non-drug reasons,** such as increased frailty, vision changes, home environment?
- ☐ Has the patient's **clinical status significantly changed recently?**
- ☐ Is it **difficult to monitor** the patient for an adverse drug effect?

If any of the above risks are present consider these options:

- Assess the benefit of the drug(s) versus the risk of injury from falling.
- Switch to a safer alternative drug, and /or consider non-drug measures.
- Since medications with fall risks usually have a dose-response relationship, start with the lowest possible dose, titrate the dose slowly upward if needed, and do regular reviews of drug response to see if the dosage can be slowly tapered downward in the future.
- Follow-up is very important to asses a recurrence of falls and the impact of medication adjustment. Monitor potential side effects, i.e. orthostatic hypotension or laboratory values.
- Assess need for treatment of osteoporosis to reduce fracture risk in older adults at high risk for falls, i.e. vitamin D, calcium, bisphosphonates, hormone replacement therapy.

Individualize treatment. Drugs are just one of many factors that can increase the risk of falling.

Examples of drugs that can increase the risk of falling, or of a serious outcome if a fall occurs (and possible mechanisms)

Falls are often caused by multiple factors. This list should be used in conjunction with other fall prevention strategies. A patient should not be denied beneficial or necessary drug therapy based on this list.

ACE Inhibitors (3)
Benazepril
Captopril
Cilazapril
Enalapril
Fosinopril
Lisinopril
Perindopril
Quinapril
Ramipril
Trandolapril

Alcohol (1,5)

Alpha Receptor Blockers (2,3,13, especially initial doses)
Alfuzosin
Doxazosin
Prazosin
Silodosin
Tamsulosin
Terazosin

Anticoagulants (8)
Acenocoumarol (nicoumalone)
Apixaban
Dabigatran
Dalteparin
Enoxaparin
Fondaparinux
Heparin
Rivaroxaban
Tinzaparin
Warfarin

Antiplatelet Drugs
Acetylsalicylic Acid
Clopidogrel
Prasugrel
Ticagrelor
Ticlopidine

Anticonvulsants (1,2,5,6,7)
Brivaracetam (1,2,5)
Carbamazepine (1,2,6)
Clonazepam (1,2,5)
Ethosuximide (1,2,5)
Gabapentin (1,2,5,6)
Lacosamide (1,2,5,6)
Lamotrigine (1,2,6)
Levetiracetam (1,2,5)
Oxcarbazepine (1,2,5,6)
Phenobarbital (1,2)
Phenytoin (1,2,5,7)
Pregabalin (1,2,6)
Primidone (1,2)
Rufinamide (1,2,5)
Topiramate (1,2)
Valproic acid (1,2,5)
Vigabatrin (1,2)

Antidepressants (1,2,3,5,6,7)
Amitriptyine
Bupropion
Citalopram (1,2,3,6,7)
Clomipramine
Desipramine
Desvenlafaxine
Doxepin
Duloxetine
Escitalopram (1,2,3,6,7)
Fluoxetine (1,2,3,6,7)
Fluvoxamine (1,2,3,6,7)
Imipramine
Lithium
Maprotiline
Mirtazapine
Moclobemide
Nortriptyline
Paroxetine (1,2,3,6,7)
Sertraline (1,2,3,6,7)
Tranylcypromine 2,3
Trazodone
Trimipramine
Venlafaxine
Vortioxetine

Antidiabetic drugs
Albiglutide (11)
Canagliflozin (3, 7)
Chlorpropamide (11)
Dapagliflozin (3, 7)
Delaglutide (11)
Empagliflozin (3, 7)
Exenatide (11)
Gliclazide (11)
Glimepiride (11)
Glyburide (11)
Insulin (10)
Liraglutide (AHFS}
Repaglinide (11)
Pioglitazone (7)
Tolbutamide (11)

Antiemetics
Aprepitant (2,5)
Dimenhydrinate (1)
Fosaprepitant (2,5)
Nabilone (1,2,3,6)
Scopolamine (1,6)

Antihistamines, sedating (1)
Cold Medications that contain sedating antihistamines (1)
Brompheniramine
Cetirizine
Chlorpheniramine
Diphenhydramine
Hydroxyzine
Trimeprazine

Antihypertensive Drugs, other (see 12)
Beta blockers
Calcium Channel Blockers

Antiparkinson Drugs (1,3,5)
Bromocriptine (1,3)
Entacapone (1,3,5)
Levodopa (1, 3,5)
Pramipexole (1, 3,5)
Rasagiline (1,3,5)
Ropinirole (1, 3,5)
Rotigotine (1, 3,5)
Selegiline (3,5)

Antipsychotics and Related Drugs (1,3,4)
Aripiprazole
Asenapine
Chlorpromazine
Clozapine
Flupenthixol
Fluphenazine
Haloperidol
Loxapine
Lurasidone
Methotrimeprazine
Olanzapine
Paliperidone
Perphenazine
Pimozide
Prochlorperazine
Quetiapine
Risperidone
Thiothixene
Trifluoperazine
Ziprasidone
Zuclopenthixol

Caffeine, large amounts (7)

Cannabinoids (1,2,3)
Cannabidiol
Marijuana

Chemotherapy (7)
Anastrozole
Bicalutamide
Buserelin
Exemestane
Goserelin
Histrelin
Letrozole
Leuprolide
Methotexate
Triptorelin

Cholinesterase inhibitors (13)
Donepezil
Galantamine
Rivastigmine

Corticosteroids, oral (7)
Corticosteroids, inhaled, high-dose (7)
Beclomethasone
Betamethasone
Budesonide
Ciclesonide
Cortisone
Dexamethasone
Fludrocortisone
Fluticasone
Hydrocortisone
Methylprednisolone
Mometasone
Prednisolone
Prednisone
Triamcinolone

Digoxin (mechanism unknown)

Diuretics, loop and thiazide
Bumetanide
Chlorthalidone
Furosemide
Hydrochlorothiazide
Indapamide
Metolazone

Eye drops (6)

Herbal products
Natural Health Products
Natural Sleep Aids
Natural Products for Sexual Enhancement (possible adulteration with undeclared drugs)

Metoclopramide (1,2,4)

Muscle Relaxants (1,2)
Baclofen
Chlorzoxazone
Cyclobenzaprine
Dantrolene
Methocarbamol
Orphenadrine
Tizanidine

Nitrates (2,3,13)
Isosorbide dinitrate
Isosorbide mononitrate
Nitroglycerin

NSAIDs
ASA/acetylsalicylic acid (8)

Opiates/Narcotics (1,2,3)
Buprenorphine
Butorphanol
Codeine
Fentanyl
Hydromorphone
Meperidine
Methadone
Morphine
Oxycodone
Sufentanil

Proton Pump Inhibitors (9)
Dexlansoprazole
Esomeprazole
Lansoprazole
Omeprazole
Pantoprazole
Rabeprazole

Sedative/hypnotics
Benzodiazepines
Barbiturates (1,2,5)
Alprazolam
Bromazepam
Buspirone
Chloral hydrate
Chordiazepoxide
Clobazam
Clonazepam
Clorazepate
Diazepam
Diphenhydramine
Doxylamine
Flurazepam
Lorazepam
Midazolam
Nitrazepam
Oxazepam
Phenobarbital
Temazepam
Triazolam
Zopiclone

Possible mechanisms (often unclear): (1) Drowsiness; (2) Dizziness; (3) Hypotension/orthostatic hypotension; (4) Parkinsonian effects; (5) Ataxia/gait disturbance; (6) Vision disturbance; (7) Osteoporosis or reduced bone mineral density increases the fracture risk if a fall occurs; (8) Risk of serious bleeding if a fall occurs. Individualize therapy. (9) Fracture risk; mechanism unclear. (10) Hypoglycemia. (11) Theoretical due to potential hypoglycemia. (12) Conflicting evidence; many studies do not find an association between antihypertensive drugs and falls or fractures with beta blockers, ARBs, calcium channel blockers or diuretics; caution with high doses and when beginning therapy. (13) Syncope.

Drugs are listed by generic (chemical) name under each drug group. For Brand (manufacturer's) names, check in the Compendium of Pharmaceuticals and Specialties under the generic product monograph.

This list includes only those drugs for which there is evidence of increased risk of falls or their consequences or a logical potential risk. There may be other drugs that increase this risk in certain patients.

British Columbia Pharmacy Association
A voice for community pharmacy

BCFIPC

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

BC INJURY research and prevention unit

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