Medications and falls in the elderly

DRUG INFORMATION AND RESEARCH CENTRE

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Approximately one-third of community-dwelling persons aged 65 years and older have one or more falls each year.[1-3] The incidence increases to 60% for residents of nursing homes.[3] Falls in the elderly are associated with significant morbidity, including hip fracture, reduced functioning, and even mortality.[1,2,4,5] Many medications have been implicated as risk factors for falls.

Case

Martha is a 75-year-old female with a history of hypertension. Her current medications include atenolol 50 mg once daily, ramipril 5 mg once daily, and a calcium/vitamin D supplement to help prevent osteoporosis. She is concerned because her sister-in-law had a fall that resulted in a hip fracture, and the doctor said that the medications she was taking, which included ramipril, probably contributed to the fall. Martha would like to know if her current drug regimen puts her at risk for falls.

Proposed mechanisms

Many mechanisms have been proposed for medication-related falls. Table 1 summarizes adverse drug effects that may contribute to the risk of falls in older persons. Such adverse reactions may be more common in the elderly because of changes in drug metabolism or clearance resulting from impairment in hepatic or renal function.[2,6] In addition, drug interactions leading to adverse reactions (e.g., additive or synergistic side effects) may also be more prevalent in older persons, as they are often on multiple medications.[4]

TABLE 1 — **Potential adverse effects of medications contributing to falls in the elderly**

Adverse drug effect	Medication(s)*
Agitation	Antidepressants, caffeine, neuroleptics, stimulants
Arrhythmias	Antiarrhythmics
Cognitive impairment, confusion	Benzodiazepines, narcotics, neuroleptics, any drug with anticholinergic effects
Dizziness, orthostatic hypotension	Anticonvulsants, antidepressants, antihypertensives, benzodiazepines, narcotics, neuroleptics
Gait abnormalities, extrapyramidal reactions	Antidepressants, metoclopramide, neuroleptics
Increased ambulation	Diuretics
Postural disturbances (e.g., problems with balance)	Anticonvulsants, benzodiazepines, neuroleptics
Sedation, drowsiness	Anticonvulsants, antidepressants, benzodiazepines, narcotics, neuroleptics
Syncope	Beta-blockers, nitrates, vasodilators (e.g., alpha$_1$-adrenergic blockers such as doxazosin)
Visual disturbances (e.g., blurred vision)	Neuroleptics, any drug with anticholinergic effects

*Not an exhaustive list; many other agents may cause adverse effects specified.

Implicated drugs

Several classes of drugs have been associated with an increased risk of falling (see Table 1); however, the magnitude of risk associated with individual classes has been reported inconsistently in the literature.[1,6] This may be, in part, due to the fact that some investigators have attempted to control for confounding factors (e.g., medical conditions that increase the risk of falling), whereas others have not.

Agents that have been associated with falls, regardless of controlling for confounders, include anticonvulsants, antidepressants, antipsychotic/neuroleptics, benzodiazepines, class IA antiarrhythmics (e.g., procainamide, quinidine), digoxin, diuretics, narcotic analgesics, and sedative/hypnotics.[1,2,5,10-12]

Selective serotonin reuptake inhibitors (SSRIs) were previously thought to be associated with a lower risk of falls in older patients

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compared with tricyclic antidepressants (TCAs).[6] However, available data suggest that there is little difference in the rate of falls or risk of hip fractures between those treated with SSRIs or TCAs.[7,13,14]

Similarly, short-acting benzodiazepines do not appear to have any clear advantage over longer-acting benzodiazepines in terms of risk for falls, as was once thought.[5,7,10]

Drug-related factors

While the use of a particular drug or drug class may be an independent risk factor for falls, other parameters relating to drug use can increase risk even further. Both dose and time since starting a medication have been reported to impact the risk of falling with different agents.[4,10] The risk with benzodiazepines appears to be increased in the first one to two weeks after starting therapy, and when higher doses are used (i.e., >8 mg diazepam or equivalent per day).[6,11] The risk of falling with antidepressants may also be dose-related, although data are conflicting.[6]

The use of a greater number of prescription medications, regardless of pharmacologic classification, has also been associated with increased risk for falls.[1,4,12] Patients taking four to five drugs or more seem to be at increased risk compared with those taking fewer medications.[1,4,12]

MEDICAL CONDITIONS THAT CONTRIBUTE TO FALLS IN THE ELDERLY[1,2,4,6]

- Alzheimer's disease, other dementias
- Arthritis, other pain syndromes
- Cardiovascular/cerebrovascular diseases
- Depression/neurosis/psychosis
- Diabetes mellitus
- Osteoporosis
- Parkinson's disease
- Seizure disorder

Non-drug risk factors

Falls in the elderly are multifactorial in etiology, and medications are only one contributing factor.[1,2,4] Intrinsic risk factors (i.e., those related to the individual) that increase the risk for falls include age-related decline in vision, hearing, strength, mobility, and musculoskeletal function, as well as a variety of chronic and acute illnesses (see box).[1,2,4,6] Extrinsic risk factors (i.e., those related to the environment) include things like loose rugs, lack of stair rails, improper footwear, etc.[1,4]

Prevention/management

Patients who have fallen or who are at significant risk of falling should have their medications thoroughly reviewed and considered for elimination or dose reduction as appropriate.[1,5] Particular attention should be paid to those classes of drugs that have been associated with falls. If possible, such medications should be avoided where not clinically essential, as is often the case with benzodiazepines and other sedatives.[8] When therapy with an agent that may increase risk for falls is required, starting with "geriatric doses" (typically one-half to one-fourth the normal adult dose) and titrating slowly with close monitoring can help minimize risk.[6]

Pharmacist's role

Reassure Martha that neither of the medications she is taking have been directly linked to an increased risk for falls. Tell her that preventing osteoporosis (as she is doing with the use of calcium and vitamin D) will decrease the likelihood of fractures should a fall occur. Recommend participation in a community-based exercise program that includes balance and strength training, as this may also decrease risk for falls while providing other overall health benefits.[1] ■

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