

Falls and Mobility Disorders

Definition

An event that results in a person's inadvertently coming to rest on the ground or lower level with or without loss of consciousness or injury. Excludes falls from major intrinsic event (seizure, stroke, syncope) or overwhelming environmental hazard.

Etiology

Typically multifactorial. Composed of intrinsic (e.g., poor balance, weakness, chronic illness, visual or cognitive impairment), extrinsic (e.g., polypharmacy), and environmental (e.g., poor lighting, no safety equipment, loose carpets) factors. Commonly a nonspecific sign for one of many acute illnesses in older persons.

Evaluation

Exclude acute illness or underlying systemic or metabolic process (e.g., infection, electrolyte imbalance as indicated by history, examination, and laboratory studies).

- Laboratory tests for persons at risk: CBC, serum electrolytes, BUN, Cr, glucose, B12, thyroid function.
- Bone densitometry in women with additional risk factors for osteoporotic fracture.
- Imaging: neuroimaging if head injury or new, focal neurologic findings on examination or if a CNS process is suspected.
- Ambulatory cardiac monitoring rarely helpful.
- Arrhythmic evaluation only if clinical evidence of this diagnosis (eg, hx of cardiac events or abnormal ECG).
- Drug concentrations for anticonvulsants, antiarrhythmics, TCAs, and high-dose aspirin.

History

- Circumstances of fall (e.g., activity at time of fall, location, time)
- Associated symptoms (e.g., lightheadedness, vertigo, syncope, weakness, confusion, palpitations)
- Relevant comorbid conditions (e.g., prior stroke, parkinsonism, cardiac disease, diabetes mellitus, seizure disorder, depression, anxiety, anemia, sensory deficit, glaucoma, cataracts, osteoporosis, cognitive impairment)
- Previous falls
- Medication review, including OTC medications and alcohol use; note recent changes in medications; note drugs that have hypotensive or psychoactive effects
- Ask about persons' ability to complete activities of daily living: bathing, dressing, transferring, continence

Physical

Look for:

- Vital signs: postural pulse and BP changes at 1 and 2 minutes, fever, hypothermia
- Head and neck: visual impairment (especially poor acuity, reduced contrast sensitivity, decreased visual fields, cataracts), motion-induced imbalance (Dix-Hallpike test), bruit, nystagmus
- Musculoskeletal: arthritic changes, motion or joint limitations (especially lower extremity joint function), postural instability, skeletal deformities, podiatric problems
- Neurologic: slower reflexes, altered proprioception, altered mental status, focal deficits, peripheral neuropathy, gait or balance disorders, muscle weakness (especially leg), instability, tremor, rigidity
- Cardiovascular: heart arrhythmias, cardiac valve dysfunction
- Other: fever; hypothermia

Gait, Balance, and Mobility Assessment

- Functional gait and balance: Observe patient rising from chair, walking (stride length, velocity, symmetry), turning, sitting (Timed Get Up and Go test)
- Balance: Side-by-side, semi-tandem, and full tandem stance; Functional Reach test
- Mobility: Observe the patient's use of assistive device (cane, walker, or personal assistance), extent of ambulation, restraint use, footwear evaluation

Medications Associated with Increased Fall Risk

- Antipsychotics (especially phenothiazines)
- Sedatives, hypnotics (including benzodiazepines)
- Antidepressants (including MAOIs, SSRIs, TCAs)
- Antiarrhythmics (Class 1A)
- Anticonvulsants
- Anxiolytics
- Antihypertensives
- Diuretics

Prevention

Goal is to minimize risk of falling without compromising mobility and functional independence.

- Fall risk assessment should be part of routine primary health care visit (at least annually). Risk of falling significantly increases as number of risk factors increases.
- Assess for risk factors using a multidisciplinary approach, if appropriate, including medical and occupational therapy.
- Diagnose and treat underlying cause.
- Initiate fall prevention program targeting interventions for risk factors (see Preventing Falls Table). A structured, interdisciplinary approach should be used.
 - Offer hip protectors to non-bedbound residents of nursing homes and others at high risk -Available via <http://www.hipprotector.com>, <http://www.hipsaver.com>, or <http://www.fallguard.com/index.asp>.
 - Recommend minimum supplementation of calcium (1200 mg/d) and vitamin D (800 IU).
- Focus on patients with most common risk factors which include muscle weakness, history of falls, gait deficit, balance deficit, use of assistive devices, visual deficit, arthritis, impaired ADLs, depression, cognitive impairment, age > 80 yr.

Preventing Falls: Selected Risk Factors and Suggested Interventions

Risk Factor	Interventions
Medication-related factors	
Use of benzodiazepines, sedative-hypnotics, or antipsychotic	<p>Consider agents with less risk for falls (eg, atypical antipsychotics such as olanzapine, risperidone, or quetiapine)</p> <p>Taper and D/C medications, as possible</p> <p>Address sleep problems with nonpharmacologic interventions</p> <p>Educate regarding appropriate use of medications and monitoring for side effects</p>
Recent change in dose or number of prescriptions medications or use of ≥ 4 prescription medications or use of other medications associated with fall risk	<p>Review medication profile and modify, as possible</p> <p>Monitor response to medications and to dose changes</p>
Mobility-related factors	
Presence of environmental hazards (eg, improper bed height, cluttered walking surfaces, lack of railings, poor lighting)	<p>Improve lighting, especially at night</p> <p>Remove floor barriers (e.g., loose carpeting)</p> <p>Replace existing furniture with safer furniture (e.g., correct height, more stable)</p> <p>Install support structures (e.g., railings and grab bars, especially in bathroom)</p> <p>Use nonslip bathmats</p>
Impaired gait, balance, or transfer skills	<p>Refer to PT for comprehensive evaluation and rehabilitation</p> <p>Gait training</p> <p>Balance or strengthening exercises</p> <p>If able to perform semi-tandem stance, refer for Tai Chi, dance, yoga, or postural awareness</p> <p>Provide training in transfer skills</p> <p>Prescribe appropriate assistive devices</p> <p>Recommend protective hip padding</p> <p>Environmental changes (e.g., grab bars, raised toilet seats)</p> <p>Recommend appropriate footwear (e.g., good fit, non slip)</p>
Impaired leg or arm strength or range of motion, or proprioception	<p>Strengthening exercises (e.g., use of resistive rubber bands, putty)</p> <p>Resistance training 2-3 x/wk to 10 repetitions with full range of motion, then increase resistance</p> <p>Tai Chi</p> <p>Physical therapy</p>
Medical factors	
Parkinson's disease, osteoarthritis, depressive symptoms, impaired cognition, other conditions associated with increased falls	<p>Optimize medical therapy</p> <p>Monitor for disease progression and impact on mobility and impairments</p> <p>Determine need for assistive devices</p>
Postural hypotension: drop in SBP ≥ 20 mm Hg (or $\geq 20\%$) with or without symptoms, either immediately or within 3 min of standing	<p>Review medications potentially contributing and adjust dosing or switch to less hypotensive agents; avoid vasodilators and diuretics if possible</p>

Medical factors (continued)

	Educate on activities to decrease effect (e.g., slow rising, ankle pumps, hand clenching, elevation of head of bed) and slow rising from recumbent or seat position
	Prescribe pressure stockings (e.g., Jobst)
	Liberalize salt intake
	Caffeinated coffee (1 cup) or caffeine 100 mg with meals for postprandial hypotension
	Consider medication to increase pressure (if HTN, heart failure, and hypokalemia not serious):
	-midodrine (<i>ProAmatine</i>) 2.5-5 mg tid [T: 2.5, 5]
	-fludrocortisone (<i>Florinef</i>) 0.1 mg qd-tid [T: 0.1]
Vision or hearing impairment	Refraction
	Cataract extraction
	Good lighting
	Home safety evaluation
	Cerumen removal
	Audiological evaluation with hearing aid, if appropriate

Adapted with permission from the American Geriatrics Society

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