Primary Care Approach for Evaluating the Risk of Falls with Elderly Patients

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Learning Objectives

☑ Identify the scope of the problem
☑ Describe the contributing factors for falls
☑ Address fall prevention and intervention programs
Definition of Fall

“an event in which a person unintentionally or inadvertently comes to rest on the ground”

Scope of the Problem

- High incidence
- High morbidity
- Mortality
- High service use
- Multiple causes and risk factors
- Potentially preventable
Incidence of Falls in U.S.

1 of every 3 adults over 65 years fall in every year
2/3 of them will fall again within the year
2 of every 3 nursing home residents fall in every year

Location of Falls

- Home 60%
- Public Places 30%
- Nursing Home 10%
Consequences of Falls

- **Mortality** - 85% of deaths due to accidents at home
  - Males > Females
- **Morbidity** - Up to 20-30% result in injury requiring care
  - **Fractures**
  - Soft tissue injuries
  - Head trauma - leading cause of traumatic brain injury in elderly
  - Joint distortions and dislocations
  - **Loss of confidence** - fear of falling
  - Restricted activity in 40-60% of fallers
- Annual fall-related injury cost is > $20 billion

Fear of Falling

- 30% - 50% fear falling
- Those who fall are 2-3 times more likely to fall again
- Loss of self-confidence
- Decrease of physical activity level & quality of life
- Fear of not being able to get up after a fall
  - 50% of fallers are able to get up on own
- Associated with living alone, cognitive impairment, depression, balance and mobility impairments, obesity
Reasons Why Falls Occur

**Intrinsic Factors**

**Extrinsic Factors**

Threat to the normal homeostatic mechanisms that maintain postural stability is superimposed on underlying age-related declines in balance, gait stability, and cardiovascular function.

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Reasons Why Falls Occur

**Intrinsic Factors**

**Extrinsic Factors**

Normal Aging Changes

FALLS
Intrinsic Factors

Normal Aging Changes

• Neurologic
  – Proprioception \( \downarrow \)
  – Reaction time \( \uparrow \)

• Gait
  • Slower
  • Stride length and arm swing \( \downarrow \)
  • Lateral sway
Intrinsic Factors
Normal Aging Changes

- Neurologic
  - Gait
    - Vision
      - Accommodation ↓
      - Dark adaptation ↓

- Muscle mass ↓
Reasons Why Falls Occur

Intrinsic Factors

Normal Aging Changes

Chronic & Acute Disease

Extrinsic Factors

FALLS

Intrinsic Factors

Chronic Disease

- Perceptual deficits
  - Cataracts
  - Macular degeneration
  - Hearing loss
  - Vestibular disease
  - Peripheral neuropathy
  - Cognitive impairment

- Neuromuscular
  - Stroke
  - Parkinson’s Disease
  - Hydrocephalus
  - Sciatica

Cardiovascular
  - Arrhythmia
  - Valvular disease
  - Postural hypotension
  - Post-prandial hypotension
  - Carotid Sinus Syndrome

Orthopedic
  - Arthritis
  - Orthopedic injury
  - Spinal stenosis

Urinary
  - Urinary incontinence
Intrinsic Factors

Acute Illness
- Delirium
- UTI
- Pneumonia
- Diarrhea
- Dehydration
- Vomiting

Reasons Why Falls Occur

Intrinsic Factors
- Normal Aging Changes
- Chronic & Acute Disease
- Trouble Walking

Extrinsic Factors

FALLS
**Intrinsic Factors**

**Trouble Walking**
- Trouble walking increases with age
  - > 65 y/o: 15%
  - 85 y/o: 25% men; 33% women
- 2/3 of seniors in hospital/Nursing Homes can not walk w/o assistance
- Previous falls

**Reasons Why Falls Occur**

- **Intrinsic Factors**
  - Normal Aging Changes
  - Chronic & Acute Disease
  - Trouble Walking

- **Extrinsic Factors**
  - Medications
Extrinsic Factors

Medications

- Polypharmacy – 4+ medications
- Non-adherence to regimen
- Big offenders:
  - Sedatives → confusion, motor dysfunction
  - Neuroleptics → confusion
  - Antipsychotics → hypotension
  - Antidepressants (SSRIs = TCAs) → hypotension
  - Antihypertensives (vasodilators) → postural hypotension
  - Anti-anxiety (benzos) → confusion
  - Diuretics → urinary urgency

Reasons Why Falls Occur

Intrinsic Factors
- Normal Aging Changes
- Chronic & Acute Disease
- Trouble Walking

Extrinsic Factors
- Medications
- Environmental Hazards
Extrinsic Factors

Environmental Hazards
- Clutter
- Loose rugs
- Electrical cords
- Poor lighting on stairs and hallways
- Lack of bathroom safety, e.g. grab bars in tub
- Slippery floors
- Moveable furniture
- Stairs

Reasons Why Falls Occur

Intrinsic Factors
- Normal Aging Changes
- Chronic & Acute Disease
- Trouble Walking

Extrinsic Factors
- Medications
- Environmental Hazards
- Improper use of Equipment
Extrinsic Factors

Improper use of Equipment
- Functional impairments - limited Activities of Daily Living
- Cane/Walker
- Footwear

Causes of Falls are Multifactorial
- Falls result from the interaction of multiple physiologic changes, pathologic conditions, external hazards, and situational stresses
- Risk of falling increases with # of risk factors
  - 10-27% of community-dwelling elders with 0-1 risk factor fall
  - 68-78% of community-dwelling elders with >/= 4 risk factors fall
Assessment of Risk & Intervention

USPSTF - No single recommended tool or brief approach can reliably identify older adults at increased risk for falls. Several reasonable and feasible approaches are available for PCPs.

- “Get-up and Go” Test
  - Check for balance, gait, and mobility
- Review
  - Chronic medical conditions
  - Medications
  - Visions and hearing ability
  - Foot disabilities
- Evaluate environmental hazards
  - Home hazards

GET UP AND GO TEST
Ask the patient to stand up from a sitting position, walk 10 m, turn and go back to the chair.

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**“Get up and Go” Test**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Unable to stand without pushing off</td>
<td>• Quad strengthening</td>
</tr>
<tr>
<td>• Positive Romberg or poor balance</td>
<td>• Balance training: Tai Chi, Athletic shoes, correct vision, assist device</td>
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<tr>
<td>• Gait Disorder</td>
<td>• Physical Therapy</td>
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<td></td>
<td>• Neurology consultation</td>
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</tbody>
</table>

**Resistance Training Improves Muscle Mass and Strength**

- 100 frail nursing home residents aged 72-98 (mean 87) randomized to 10 weeks of progressive quadriceps resistance training or placebo
- Results:
  - 113% increase in muscle strength
  - 12% increase in gait velocity
  - 28% increase in stair climbing power
  - 3% increase in thigh muscle area
# Medication Risk Factors

<table>
<thead>
<tr>
<th>Class</th>
<th>Intervention</th>
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<tbody>
<tr>
<td>Antihypertensives</td>
<td>Discontinue</td>
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<tr>
<td>Alpha-blockers</td>
<td>Reduce Dose</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>Substitute</td>
</tr>
<tr>
<td>Sedatives &amp; hypnotics</td>
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<tr>
<td>TCA’s</td>
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<td>SSRI’s</td>
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<tr>
<td>Dopaminergics</td>
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<tr>
<td>Anticholinergics</td>
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# Abnormalities in BP Regulation

## Physiologic Mechanism
- Reduced baroreflex sensitivity
- Decreased cerebral blood flow
- Reduced renal salt and water conservation
- Decreased diastolic filling
- Vascular stiffness

## Pathologic Consequences
- Syncope
- Orthostatic hypotension
- Postprandial hypotension
- Drug-induced hypotension
- Dehydration
- Carotid sinus syndrome
Orthostatic Hypotension

Problem

• Fall in BP and rise in HR

Interventions

• Stop hypotensive meds
• Liberalize salt and fluids
• Support hose
• Exercises, avoid straining
• Fludrocortisone

Assist Devices

• Hip pads
• Mobility aids
  – Cane
  – Walkers
  – Wheelchairs
• Bathroom aids
  – Raised toilet seats
  – Grab bars
Vitamin D

- Men and women over age 65 years with low serum 25-hydroxyvitamin D concentrations (<10 ng/mL) are at greater risk for loss of muscle mass, strength, and hip fractures.
- Evidence is not definitive for benefit on incidence of falls.
  - 2014 guidelines from the American Geriatrics Society: Vitamin D3 given daily, weekly, or monthly with the dose adjusted to achieve the dosing equivalence of at least 1000 units daily.
  - Guidelines from the Agency for Healthcare Research and Quality and the US Preventive Services Task Force suggest a dose of at least 800 IU daily.

Best Practices for Older Adults from Recent Clinical Studies

1. Clinical assessment & risk reduction
2. Exercise to improve balance, gait, strength, endurance, & flexibility
3. Medication management: especially benzodiazepines, antidepressants, sedatives/hypnotics
4. Multi-component programs
Applying the Guidelines to the Individual Patient

• Treat any acute illness
• Treat specific conditions affecting balance i.e. Parkinson’s disease, osteoarthritis, stroke
• Correct postural hypotension or arrhythmia
• Rationalize medication especially psychotropics
• Correct visual impairment where possible
• PT: balance and strength training
• OT: environmental hazard check, safety awareness
• Commence osteoporosis treatment where indicated

Advice for Patients

✓ Educate patient how to use assistive devices
✓ Arise slowly (count to 30 when changing position)
✓ Maintain adequate hydration and provide small frequent meals with rest periods after meal
✓ Physical Exercise: 20 minutes of walking daily
✓ Avoid Alcohol
✓ Recommend Lifeline device
✓ Environmental safety:
  ✓ Home assessment by home health
  ✓ Install railings & lights
  ✓ Secure rugs & cords
  ✓ Fix stairs
  ✓ Demarcate edges
Summary

- Risk factors, best practices & effective interventions have been identified for community-dwelling older adults after many years of research.

- Injury prevention is an important goal in populations at high risk for falls.

- Comprehensive prevention plans/programs that include individual risk assessment & individualized multi-component/multi-faceted intervention approaches are the most effective in reducing falls & fall risks.