Falls and Mobility in the Elderly

Lumps, Bumps and Thumps
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40% of females and 13% of males will have at least one fragility related fall in their lifetime.
International Osteoporosis Foundation

After age 65, 35% of community dwelling adults reported at least 1 fall in preceding year.
Causes were:
53% tripping
8% dizzy
6% blackouts
19% unknown
Blake AJ, Age and Aging, 1988, Nov (17)6; 365-372

Falls are the leading cause of ER visits for the elderly in the United States.

65+ rate is 12/100
85+ rate is 25/100
Indirectly, falls account for 20% of accidental deaths in the elderly after age 75.
20% of all fragility fractures occur in women
Lifetime risk for white women is 1 in 6
Mortality rate is 4-6% in the year following a hip fracture
40% will require assistive devices
60% will require assistance
33% will require SNF or totally dependent care

AAFP, George Fuller, Col, MC 4-1-2000, Int’l Osteoporosis Foundation
In 2005, 2 million hip fractures from falls resulted in 17 billion dollars in medical costs.
- 57% inpatient care
- 30% long term care
- 13% outpatient care

This is expected to grow to 25 billion dollars (in 2005 prices) by the year 2025.

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**Costs**

**Risk Factors**

Demographic
- White and Asian ethnicity
- Homebound
- Living alone
- Female

Genetic
- Parental history of fracture increases risk independent of BMD

Historical
- Previous falls

Risky behaviors (4x inc. with 4 servings of ETOH daily)

**Age and Illness related risk factors**

- Age over 75
- Acute or chronic illness, esp. neuromuscular
- Medications, esp. 4 or more prescription meds
- TCAs, sedative/hypnotics
- Cognitive impairment
- Reduced vision
- Foot problems
- Age related neurologic changes
- Decreased hearing
- Corticosteroid use (inc. risk 2x female, 2.6 x male)

International Osteoporosis Foundation website
Other risk factors, cont’d

- PPIs
- Low body wt.
- Female triad syndrome (amenorrhea, eating disorder, osteoporosis)
- BZPs, antidepressants, neuroleptics
- Sedentary lifestyle, non-weight bearing
- Low birth weight

Int’l Osteoporosis Foundation website

External risk factors

- Environmental Factors
  - Home environment (Requires a home visit or PT eval.)
    - Loose rugs
    - Unstable furniture
    - Telephone and loose cords and plugs
    - Poor lighting
    - Pets
    - Uneven flooring
    - Multilevel housing, stairs, loose railings
    - Glitter in the home
  - Assistive Devices, may help prevent but also cause falls.
    - Canes, walkers
    - Orthotics
    - Grab bars in bathroom, showers
    - Rubber mats in shower

General Examination

- Up to date general exam and thorough past medical, surgical and family/social history.
- Focused history
  - Screening questions
    - Any falls in preceding year
    - Difficulties in walking
  - History of falls, circumstances, frequency, symptoms at time, injuries
  - Medication review: over the counter and prescribed meds
  - Review of risk factors: chronic and acute conditions, osteoporosis, UTIs, CV dz, neuropathy from DM, urinary incontinence
Physical exam
a. Detailed assessment of gait, balance and mobility, Lower Extremity function (see POMA and Timed Get Up And Go test.
b. Neurologic function
c. Muscle strength
d. CV status
e. Visual acuity
f. Exam of feet and footwear

Mobility evaluation

Timed Get Up And Go Test (best screening tool for primary care setting)
Start from seated armchair:
1. stand up from arm chair
2. walk 3 meters in a line
3. turn
4. walk back to chair
5. sit down

Scoring:
Normal: < 10 seconds
Abnormal: >20 seconds


Detailed Mobility Testing

Performance-Oriented Mobility Assessment (POMA)
Balance (also called Tinetti test)
1. Sitting down
   a. unable to get up without help or collapses over
   b. needs minimal help
   c. self to self appropriately
   d. self to wall

2. Sitting balance
   a. unable to maintain position, slides to side or forwards
   b. leans in chair slightly
   c. steady, safe and holds upright position

3. Arise
   a. unable to get up without help of needs over 3 attempts
   b. able but requires 3 attempts
   c. able but requires 2 attempts
   d. able but requires 1 attempt
   e. able without help

4. Innovation standing balance
   a. steady, stagger, moves feet, reaches/takes away, or grabs objects for support
   b. steady but uses walker or cane, reaches without grabbing object
   c. steady without walker, cane or other support
Stand

Side-by-side standing balance
- unable or unsteady or unable to hold for 3 seconds
  1- able but uses cane, walker or other support or holds for over 4 sec
  2- narrow stance without support for 10 sec

Pull test (mild pull at waist)
1- begins to fall
2- takes more than 2 steps back
3- fewer than 2 steps back and steady

R leg unsupported
1- unable or holds onto object or < 3 sec
2- able for 3-4 sec
3- able for 5 or more sec

Bare floor (hard smooth, flat surface)
1- any hesitancy
2- no hesitancy

Gait

Missed step
1- able
2- takes 1 step
3- hesitates or loses balance

Path
1- marked deviation
2- mild deviation or uses walking aid
3- straight without walking aid

Turning (while walking)
1- almost falls
2- mild staggering, catches self, uses walker or cane
3- steady, no walking aid

Step over obstacles
1- able to step over but some staggering
2- able to step over, no missed steps

Mary E Tinetti MD, 1985, Am J of Med, 80(3); 429-434

Scoring of Tinetti/POMA

- 28 is maximum score
- 23-28 is good
- Less than 19 indicates high fall risk
Modification of Risks

- Strongly recommended:
  - Custom tailored interventions based on previous exam and mobility eval.
  - Modification of home environment
  - Exercise, balance, strength and gait training
  - Use of other ancillary health providers
  - Vitamin D supplementation if proven Vit D deficiency

Modification of Medications

1. Reduction and weaning off all psychoactive substances. (BZPs, Ambien, Lunesta, Sonata, Opioids, Alcohol)
2. Antihypertensives (esp. Alpha blockers and Beta blockers)
3. Antidepressants (TCAs, SNRIs) So far SSRIs appear safer for fall risk.
4. Reduction of total number of medications to less than 5.
Studies have shown that balance, gait, strength training all have good correlation with decreased fall risk.

Recommended:

1. New to exercise patients
   - Tai Chi, gentle Yoga, or physical therapy directed gait and mobility programs
2. Mature athletes or regular exercise patients
   - Martial arts, advanced weight training, bicycling, skiing, hiking
   - Balance boards or turntables, advanced Yoga techniques

### Bibliography

AAFP, April 2000, George F Fuller, Col. USMC, “Falls in the Elderly”

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