Fall Prevention and Management

Osteoporosis CME 2013
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Why learn about falls?

• The other half of the equation

Osteoporosis + Fall = Outcomes we care about:

  fractures
  hospitalization
  disability
  death
  anxiety and fear
  institutionalization

Fifteen seconds

Presenter Disclosure Information

Louise Aronson

• No disclosures
Every 15 seconds
AN OLDER AMERICAN
is seen in an Emergency Department
BECAUSE OF A FALL

Every 29 minutes
an older American
**DIES**
because of a fall

How many have died already today?

Objectives
By the end of this discussion, participants should be able to:
• Discuss the epidemiology of older adult falls
• Identify the essentials of a fall assessment
• Describe interventions that have been demonstrated to reduce falls in clinical trials
• Develop an exercise prescription for an older person at risk for falls

Epidemiology
Question #1
What % adults > 65 yrs old living in the community fall each year?

A. 5%
B. 10%
C. 20%
D. 30%
E. 50%

Falls Are Common
- Fifth leading cause of death in older adults

Falls Are Costly
- Total Lifetime Medical Costs of Unintentional Fatal Fall-Related Injuries* in People 65 Years and Older By Sex and Age, United States, 2005

Falls Are Morbid
- Hip fracture 55%
  - 1/5 will die within a year of the fracture
- Non-hip fractures 21%
- Traumatic Intracranial hemorrhage (10%)
  - More common in men, A/Am
- Chest Injury (7%)
Question #2

What % of falls occur at home during normal activities?

A. 25%
B. 45%
C. 55%
D. 70%
E. 85%

Falls Are Morbid

- 60% fallers report moderate activity restriction
  - 15% report severe restriction
- 1/3 require help with ADLs
- 3x risk of nursing home placement
- 1/3 develop fear of falling
  - ↓ physical and social activity
  - ↓ self-reported health
  - depression

Assessing a Patient Who Falls

CASE 1: Mrs. FF (First Fall)

- 77 year old woman with HTN, hypothyroidism, osteoporosis, GERD
  - Meds: diltiazem, synthroid, PPI, fosamax
- Fell in her apt, taken to ED, ok now
- Has never fallen before

What else do you want to know?
What do you do?
Evaluation of Falls: History

- Rule out acute badness
  - Syncope, i.e. not fall?
  - Injury?
  - Acute illness?
- This should be done even if you are seeing the patient days/weeks later
- Mrs. FF: No LOC, head lac, URI

Evaluation of Falls: History

- The fall history
  - Location & circumstances
  - Associated symptoms
  - Witness accounts
  - Ability to get up
- Other falls or near falls?
- Any recent changes in
  - Medication
  - Living situation/environment
  - Assistive device
  - Mrs. FF
    - Reaching: No
    - No
    - No
    - First fall
    - No
    - No
    - No need

Evaluation of Falls: History

- Relevant medical conditions
  - MS, neuro, card, ophtho, incont, osteoporosis
- Medications
  - Psychoactive? HTN? total # > 4?
- Substance abuse/alcohol use
- Difficulty with walking or balance
- Ability to complete ADLs
- Fear of falling
  - No
- No, yes, 4
- No
- No, walks, incl hills
- Independent
- Yes new

Question #3

What % of fallers experience moderate or severe functional decline as a result of their fall?

- A. 8%
- B. 15%
- C. 38%
- D. 60%
- E. 75%
**STEADI Falls Assessment Tool**

Waiting room: Patient completes Stop Independent Living Tool: identify main fall risk factors.

- **Clinical visit: Identify patients at risk**
  - Fall in past year
  - Falls unprovoked when standing or walking
  - Worries about falling
  - Needed 4+ of 8+ Independent Living

**Evaluate gait, strength & balance**

- 3 tests: Gait, balance, strength
- Patient follows instructions

**Cognitive impairment**

- Cognitive impairment
- Vision impairment
- Frail and sarcopenic
- Balance impairment
- Vision impairment

Evaluate gait, strength & balance

- No to all
- No, go to next
- 1 fall in past year
- 2 falls in past year
- 0 falls in past year

**Determinants of falling**

- Conduct multistate
  - Risk assessment
  - Review fall history
  - Falls history
  - Physical exam: present and past comorbidities, social environment
  - Cognitive screening
  - Medication review
  - Falls & functional
  - Strength & balance
  - Visual acuity

Implement key fall observations

- Educate patient
- Enhance gait & balance
- Improve functional mobility
- Manage medications
- Enhance environment
- Address foot problems
- Vitamin D / calcium
- Optimize vision
- Optimize home safety

**Patient follow-up**

- Review patient education
- Address barriers to adherence

**Most Common Fall Risk Factors**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Relative Risk</th>
<th># studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Falls</td>
<td>1.9 – 6.6</td>
<td>16</td>
</tr>
<tr>
<td>Balance Impairment</td>
<td>1.2 – 2.4</td>
<td>15</td>
</tr>
<tr>
<td>Decrease Muscle Strength</td>
<td>2.2 – 2.6</td>
<td>9</td>
</tr>
<tr>
<td>Vision Impairment</td>
<td>1.5 – 2.3</td>
<td>8</td>
</tr>
<tr>
<td>Meds: 4+ or psychotropic</td>
<td>1.1 – 2.4</td>
<td>8</td>
</tr>
<tr>
<td>Gait impairment</td>
<td>1.2 – 2.2</td>
<td>7</td>
</tr>
<tr>
<td>Depression</td>
<td>1.5 – 2.8</td>
<td>6</td>
</tr>
<tr>
<td>Orthostasis</td>
<td>2.0</td>
<td>5</td>
</tr>
<tr>
<td>Age &gt;80</td>
<td>1.1 – 1.3</td>
<td>4</td>
</tr>
<tr>
<td>Female</td>
<td>2.1 – 3.9</td>
<td>3</td>
</tr>
<tr>
<td>Cognitive Impairment</td>
<td>2.8 – 3.0</td>
<td>3</td>
</tr>
<tr>
<td>Arthritis</td>
<td>1.2 – 1.9</td>
<td>2</td>
</tr>
</tbody>
</table>

**Fall Risk**

Tinetti ME. 

- What is her risk for falling again?
- What else do you need to do?
Next Steps for Mrs. FF

- Complete risk assessment
  - Vision — Gait and balance
  - Orthostatic BP — Muscle strength
  - Cognition — Mood

- Or

STEADI:

Gait and Balance Evaluation

- No perfect test; no adequate cut off score
- Timed Up and Go (TUG)
  - Quick, validated in-office test
    - Stand from chair → walk 10 feet → return → sit
    - 20 seconds = grossly abnormal
    - Time less important than clinical judgment
  - CDC video
    http://www.cdc.gov/homeandrecreationalsafety/Falls/steadi/videos.html

- Alternate: Physical Therapy Evaluation
  - Insurance/$ dependent
  - Outpatient v Home Care

Question #4

Who is more likely to (1) be injured and (2) die from a fall?

A. Women
B. Men
C. No gender difference

CASE2: Mr. RF (Recurrent Faller)

- 86 years old lying on exam table
- CAD/MI, CABG4, AD, HTN, L TKR
- Bruised eye/cheek
- R leg in brace, new walker beside table

What else do you want to know?
What do you do?
The Assessment

Mr. RF

• R/o elder abuse
• Ask about syncope, injury, illness

• His history
  – Tripped on stair, had single pt cane in hand
  – No abuse or syncope, R quad tear, not ill when fell
  – He has fallen 3 times in the last year
  – 9 meds none new, some ETOH
  – Gait unsteady, not afraid of falling

What’s next?

Evaluation of Falls: PE

• Ortho BP
• Cognition
• Meds
• Feet/footwear
• Gait/balance
• Assistive device use
• Vision
• CV exam
• MSK

• Borderline
• MOCA 20/30
• 9, no psychoactive
• Good
• Slow, unsteady/poor
• Poor
• Scratched trifocals
• NSR
• Atrophy, ROM Rt UE, hip contractures

Gait and Falls

• You have not fully examined the nervous or musculoskeletal systems until you have analysed the gait

• Gait abnormalities
  – 20-40% age >65  50% if >85
  – Speed predicts 10 year mortality

• At least assess
  – Normal or abnormal
  – Safe or unsafe
  – Too slow, too fast
Mr. RF: Formulating a Care Plan

- Address RF & findings from H & P
  - Today
    - D/c any meds?
    - PT/OT referral
      - Walker training
      - Exercise
    - Home safety evaluation
    - Vit D level/rx
  - Later visit
    - Assess ETOH
    - Ophtho f/u
    - Osteop eval/tx

Question #3

What are the three falls management strategies with the best supporting evidence?

A. Exercise program, vitamin D, and multifactorial assessment
B. Exercise, multifactorial patient assessment, home assessment
C. Exercise, vitamin D, medication withdrawal/minimization
D. Medication withdrawal/minimization, home assessment, exercise
E. Experts only agree on exercise
### Cochrane Review

<table>
<thead>
<tr>
<th>Intervention</th>
<th>↓ Rate of Falls</th>
<th>↓ Risk of Falling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple-component group exercise</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Multiple-component home exercise</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tai Chi</td>
<td>Almost</td>
<td>Yes</td>
</tr>
<tr>
<td>Multifactorial intervention</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Vitamin D*</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Home safety assessment*</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cognitive-behavioral interventions</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Patient education</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

* But prevents fractures

* Best if done by OT

### Cochrane Review: Other findings

- **Vision correction**
  - One trial increased risk
  - Trifocal wearers who go outside a lot fell less with single lens glasses
- **First eye cataract surgery decreased falls**
  - Not second eye; only women in trial
- **Multifaceted podiatry decreases falls if foot pain**
- **Antislip shoe device in icy conditions**
- **Medication interventions**
  - Psych med withdrawal lower rate
  - PCP prescribing program decreased risk

### USPSTF Falls Recommendations

- **To prevent falls in community-dwelling adults aged 65 years or older who are at increased risk for falls**
  - Exercise or PT (Grade B rec)
    - Group exercise classes or at-home PT
    - Intensity from very low (≤9 hours) to high (>75 hours)
  - Vitamin D supplementation (B)
    - 600IU age 51-70 and 800IU >70
  - No automatic multifactorial risk assessment (C)
    - Base on fall hx, comorbidities, patient goals
    - Insufficient evidence for other recommendations

### Fall Prevention & Vitamin D

- **First Study: Systematic review**
  - Vit D reduced falls among older individuals by 19%
  - Beneficial dose 700-1000 IU/day
  - Aim for serum 25-hydroxyvitamin D of >60 nmols/L
- **Second study: once yearly high dose**
  - RCT 2258 women, 500 000 IU of vitamin D3
  - INCREASED risk for falls and fractures
- **Bottom line:**
  - Both too little and too much may be risky
  - ≥800 IU to decrease fx
  - Most helpful if baseline levels low
Treating Mrs. FF and Mr. RF

- Exercise
  - Both…but different rx

- Vit D
  - Both, especially if deficiency
  - Might be more cost effective to check his level first

- Multifactorial assessment
  - Mr. RF

Exercise and Falls

- Most widely studied single intervention
- Review of 19 trials of exercise interventions alone or in combination
  - 9 of 14 combination trials reduced falls by 22-46%
  - All positive trials included a balance component
  - Only 1 of 5 trials using a single exercise intervention reduced falls

  - Tai Chi group exercise
    - ↓falls ~30% (1 trial); ↓falls ~47% (1 trial)

  - Individually prescribed home based exercises
    - ↓falls ~34% (3 trials)

Exercise in Older Adults

- Many benefits, few risks
  - Maximal HR is the only immutable change with age
  - Lung, muscle, jt, other cardiac all improve
  - ↓ CAD, DM, death, falls, OA, Dn, insomnia

- Helps at all ages and levels of frailty
  - Study of 100 SNF patients mean age 87
    - ↑↑strength ↑activity ↑gait; no ↑falls
  - FICSIT: 8 independent, prospective RCTs

<table>
<thead>
<tr>
<th>Intervention</th>
<th>RR Falls</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any exercise</td>
<td>.90</td>
<td>(.81-.99)</td>
</tr>
<tr>
<td>Balance</td>
<td>.83</td>
<td>(.70-.98)</td>
</tr>
</tbody>
</table>

The Exercise Prescription

- Rx improves compliance & time spent
  - Can gradually increase each component

- The Rx: FITTS
  - Frequency
  - Intensity
  - Time
  - Type
  - Specific precautions and modifications

- Consider
  - Feasibility, cost, social benefits, safety, culture
Exercise Rx: Mrs. FF and Mr. RF

- **Mrs. FF**
  - Already walking 4-5 times a week with good time and intensity
  - Add balance (tai chi/ exercise class) and resistance

- **Mr. RF**
  - Home based PT
    - Supervised resistance and balance exercises 2/week
    - Supervised walking with assistive device daily
  - Precautions
    - Monitor HR initially
    - As directed by ortho/ leg brace

Treating Mrs. FF and Mr. RF

- **Mrs. FF:** Address fear of falling
  - Strength and balance training
  - Consider group cognitive behavioral therapy
  - Treat anxiety/depression as appropriate

- **Mr. RF:** Address/refer to address complexity
  - Goals of care/advance directives
    - Disease v. meds
    - Safety v. independence
  - Caregiver burden and safety
  - Community resources to preserve independence

Falls Summary

- Falls are common, costly, and morbid in older adults, and precipitate most fractures
- Falls can be prevented & injuries can be minimized
- Ask older adults about falls in the last year and observe gait and balance
- Evaluate/treat/refer pts at risk for future falls
- Exercise Rx increases exercise, decreases falls

Resources

Resources

- CDC
  http://www.cdc.gov/HomeandRecreationalSafety/Falls/index.html
  Great information for clinicians

- NIH Senior Health: http://nihseniorhealth.gov/falls/toc.html
  Great information for patients and families

Thank You!