Overview

• A sentinel event: definitions and background
• After the fall
• In the PCP’s office
  – Determine risk
  – Implement prevention strategies

Learning Objective

• To apply strategies that reduce the risk of falls in every patient over the age of 65

Facts About Falls

• 2.5 million ED visits/year
• 700,000 hospital admissions/year
• 1 out of 5 results in severe injury
  • Head injuries:
    • most common cause traumatic brain injury
  • Hip fractures:
    • 250,000 hip fractures/year
    • 95% due to a fall

Case: Your Mother Fell

• A call from your spouse about your 90 yo mother
• Fell wearing 1.5 inch heels, walking down ramp at church
• Pitched forward hitting face on exit door handle
• Taken to ED

What kind of fall did your mother have?

A. This person is nothing like my mother. She wouldn’t fall.
B. Non-injurious mechanical fall
C. Injurious mechanical fall
D. Injurious low trauma fall
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Defining a Fall

- “Mechanical” fall
- Low-trauma or ground level fall
- High-trauma fall
- Injurious v. non-injurious falls

“Mechanical” v. “Non-Mechanical” Falls

- Due to extrinsic factors, the environment
- “Exonerates” clinicians from working up a fall
- Environmental factors in many non-mechanical falls
- Outcomes no different
- Conclusion: stop using this term!

Low v. High Trauma Falls

- Low-impact, low trauma fall
  - From standing height (< 2 m)
  - Unintentional descent to the ground or to a lower level than before
  - Predominantly older (>61), female
  - Comorbidities, chronic conditions
  - 50% hospitalizations
- High-impact fall
  - From >2m height

Injurious (v. Non-Injurious) Falls

- Results in any injury
  - Soft tissue (bruising, laceration)
  - Fracture
- Leads to reduced physical function
- Leads to evaluation by a clinician
- Severity of harm from injury

Your Mother in the ED

Exam
- Head and right knee pain
- Heart rate 115, irregular
- BP 116/58
- Laceration over left eye required suture
- Facial ecchymoses
- Effusion right knee
- Unable to bear weight on right leg

Studies
- C-spine cleared, no fracture
- CT brain: no skull fracture, no SDH or ICH
- XR right LE: soft tissue swelling, no fracture

Admitted for observation, telemetry, pain control
What is the severity of injury or harm?

A. No injury because there is no SDH/ICH or fracture.
B. Minor injury/harm because of minor contusions (face, limb) and minor laceration
C. Moderate harm because suturing required
D. Major harm because of head trauma and hospital admission

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Additional History

PMH
- atrial fibrillation
- OA knees and hands
- chronic pain
- HTN
- macular degeneration OS
- Anxiety
- post-herpetic neuralgia
- fell 4 mo ago

Medications
- Warfarin
- Digoxin
- Metoprolol
- APAP
- AREDs
- Citalopram
- alprazolam prn (not taking)
- Donepezil
- Gabapentin, recently started for neuralgia.

Social History

- Lives with your sister x 3 yrs
- Widowed x 30 years
- Retired teacher
- Reads
- Watches CNN and the Weather Channel
- Season tickets to ballet
- Church social groups
- Uses cane or walker
- Does not drive

What are your mother's top 3 risk factors for a fall?

A. Extrinsic factors (footwear/ramp) > gabapentin > history of fall
B. Extrinsic factors (footwear/ramp) > OA pain > hypotension
C. Polypharmacy (4+ meds) > age-related decline > history of fall
D. Gait disturbance > gabapentin/citalopram > visual impairment
E. Alprazolam > digoxin > cognitive impairment
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Top 10 Intrinsic Risk Factors for Falls
1. History of fall in last 1 year
2. Gait disturbance (OA/pain, muscle weakness, neuropathy)
3. Sedentary lifestyle
4. Vertigo, dizziness, orthostasis, postural hypotension
5. Medications (act on CNS, BP, cardiac, diabetes), polypharmacy, comorbidity
6. Acute illness
7. Delirium, cognitive impairment
8. Visual, hearing impairment
9. Incontinence
10. Other CNS disease

Top 10 Medication Classes that Increase Risk of Falls
CNS-Active Meds
• Sedative hypnotics/anxiolytics (sleepers and benzos)
• Tri-cyclics
• Tranquilizers
• Anticholinergics (muscle relaxers, antihistamines, bladder agents)
• Antipsychotics, other anti-dopaminergic meds (metoclopramide)
  *also gabapentin!

Non-CNS-Active
• Anti-hypertensives
• Cardiac medications (digoxin, amiodarone, diuretic)
• Corticosteroids
• NSAIDS
• +/- Opiates

Factors that Increase Risk of Falling in Older Adults

Physiology of a Fall: Age-Related Decline

The Journal of Physiology 11 MAR 2015 DOI: 10.1113/jphysiol.2014.282665
**Physiology of a Fall**

- Stance: narrow, wide, normal
- Balance, position in space
- Gait
- Frailty:
  - wt loss, slow, weak, fatigue, sedentary/low energy; increased risk
  - Fall OR 1.38 (95% CI 1.02-1.88)
- Trajectory and injury

**Simple Math**

\[ F = P + O \]

\[ \text{Fall} = \text{Propensity to Fall} + \text{Opportunity to Fall} \]

**A Vicious Cycle**

- Increased Risk Of Falling
- Decreased Activity
- Fear of Falling
- Fall

**How does this fall change your mother’s one-year mortality?**

A. It does not affect her overall mortality.
B. Her mortality is increased slightly because of the new diagnosis of atrial fibrillation which may precipitate more falls or a stroke.
C. Her current mortality risk is increased but may be reversible because her biggest fall risk factors are modifiable.
D. Her mortality risk is increased because of her reduced gait speed and change in her functional status.

**Why do falls matter?**

- Predict bad outcomes
- Signals (multi-) organ system compromise
- Loss of physiologic reserve
- Loss of independence, function
- **Mortality:** your mother has 11% chance of dying in the next year
Falls and Mortality

- How are falls associated with mortality?
  - Trauma 5th leading cause of death >65y
  - Responsible for 70% of accidental deaths >75y
  - Gait, gait speed
- Common sense
  - Frailty: predicts 2y mortality
  - Fractures: 25% 1-year mortality with hip fracture
  - Comorbidities: exacerbated by injurious fall
  - Hospitalizations, increased morbidity
- Public health crisis?

A Sentinel Event

- An “attack”: the MA or MSKA
- Increased risk of secondary events
- Work up like you would chest pain or TIA

Your Mother’s Followup Visit with PCP

- Discharged from the hospital next day
- Home PT ordered
- Significant difficulty walking, fear of falls
- Needs help with ADLs
- Your sister, her main caregiver, is stressed
- You accompany them to PCP visit
- What do you expect regarding workup of her fall?

Gait Type, Gait Speed and Falls

- Describe gait (stance, posture, steppage)
- **Gait speed test**: predicts mortality
  - Meters/second
  - Too slow (≤ 0.6m/sec) or too fast (≥ 1.3m/sec)
  - Time to walk 4 m (13 ft), 4.67 m (15 ft)
  - Average 0.8 m/sec
- **Timed up and go**: predicts risk of falling
  - > 14 seconds = high risk of falling

PCP Assessment of Fall Risk

1. Interval history/review of systems
   1. History of falls, injuries since last visit
   2. Problem with walking, fear of falling interfering with activities
   3. Activity level and functional status
   4. Use of assistive device
   5. Pain history, assessment
   6. Medication review
2. Exam
   1. Standing blood pressure, orthostatics
   2. Yearly Timed-Up-and-Go or Gait Speed
   3. Yearly cognitive function assessment
   4. Vision, hearing
   5. Foot, footwear exam

From: Gait Speed and Survival in Older Adults

*Gait speed < 0.6m/sec or > 1.3 m/sec assoc with decreased survival.

(Studenski S et al, JAMA, 2010)
### PCP Interventions to Reduce Fall Risk, Risk of Injurious Fall

1. Deprescribe medications that increase risk
2. Increase activity level, endurance
3. Treat pain
4. Keep hydrated, fed (weight loss is bad)
5. Rx: physical therapy for strength, balance
6. Optimize cognition (meds, sleep, mood, stress)
7. Rx: assistive device
8. Rx: osteoporosis

### Summary

- A fall is a sentinel event signaling musculoskeletal compromise and risk of decreased function, increased dependence, and mortality.
- All falls in older people are multifactorial.
- Routinely (Every year? Every visit? After a fall.) assess older patients for modifiable fall risk factors.