Prevention of Falls

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Objectives

- Discuss the importance of addressing falls
- Discuss risk factors and risk assessment
- Discuss the difference between community dwelling elderly vs. “the frail elderly”
- Discuss the current data on therapeutic interventions
- Review case studies
Incidence

- 30-40% of community-dwelling people over the age of 65 years fall each year
  - This increases up to 50% for those 80 years and older
- Approximately 50% of individuals in the long-term care setting fall yearly
- Almost 60% of those with a history of a fall in the previous year will have a subsequent fall

Up to Date 2015
2013: the direct medical costs of older adult falls was estimated $34 billion
Morbidity

- Fractures (older adults)
  - Spine, hip, forearm, leg, ankle, pelvis, upper arm, and hand.
  - Hip fractures
    - tends to cause more problems than other broken bones

- Traumatic brain injuries (TBI)
  - Falls are most common cause
  - About one-half of fatal falls among older adults are due to TBI

- Fear of falling

Sources: CDC and NOF
Mortality

- In 2013, about 25,500 older adults died from unintentional fall injuries.
Risk Factors

- Past history of a fall
- Lower extremity weakness
- Age
- Female gender
- Cognitive impairment
- Balance problems
- Psychotropic drug use
- Arthritis
- History of stroke
- Orthostatic hypotension
- Dizziness
- Anemia

- Fall associated with syncope
- History of previous fall with injury
- Decreased executive function
Sedentary Behavior

- Every additional hour adults over age 60 spend sitting increases by 50% their risk of being disabled for activities of daily living such as bathing, dressing and walking, says the study's lead author - Dorothy Dunlop, a professor of medicine at Northwestern University Feinberg School of Medicine.

- Strong relationship between daily sedentary time and development of physical frailty distinct from insufficient moderate activity.

Multifactorial problem = Multidisciplinary intervention

- Functional history is key
  - Prior function vs. current function
  - Home environment
  - Family support
  - Psycho-social factors

- Establish prognosis (Rehab Potential)

- Set goal directed interventions
  - Therapy (PT/OT)
  - Assistive device
  - Education
  - Home exercise program
Considerations during the Physiatric Evaluation

- Musculoskeletal system
- Neurologic system (central vs. peripheral)
- Vestibular system
- Medication review
- Vitamin D
- Other* (co-morbidities)
  - i.e. heart problem, stroke history, COPD, Dementia
Musculoskeletal system

Changes associated with aging

Bone density loss (Osteoporosis)
Loss of muscle mass
Degenerative joint disease (Osteoarthritis)
Thinning tendons, ligaments
Gait

- Changes with Aging
  - Reduced walking speed and stride length
  - Reduced overall lower extremity strength
  - Reduced pelvic girdle balance and alignment
  - Reduced ankle control

- Pathologic Gait
  - Deformity
  - Muscle weakness
  - Impaired control
  - Pain

PM&R Principles, DeLisa 4th ed
Nervous system

- Central (CNS)
- Peripheral (PNS)
Central and Peripheral

Vestibular Pathways

- Ventral posterior nucleus of thalamus and vestibular area in cerebral cortex (part of primary somatosensory cortex)
  - Conscious awareness of the position and movement of head

- The model suggests that vitamin D supplementation and medication review are cost-effective interventions that reduce falls, provide health benefits and reduce health care costs in older adults living in RACFs.
Medications

- Medications
  - Drugs that affect the brain (CNS): neuroleptics, benzodiazepines, and antidepressants
  - Anti-hypertensives: vasodilators
Vit D

- Vitamin D
  - Supplemental vitamin D with daily doses of 800 to 1,000 IU consistently demonstrated beneficial effects on strength and balance. An effect on gait was not demonstrated, although further evaluation is recommended.

Exercise interventions

6 categories:

- Gait and balance training
- Strength training
- Flexibility
- Movement (such as Tai Chi or dance)
- General physical activity
- Endurance
“Interventions for preventing falls in older people in care facilities and hospitals.” Cameron ID et al. Cochrane Review 2012

- **Exercise**
  - subacute hospital: appears effective
  - care facilities: effectiveness uncertain

- **Multifactorial interventions**
  - hospital: reduces falls
  - care facilities: possible benefits

- **Vit D**
  - effective
Exercise interventions in community-dwelling older people probably reduce fear of falling to a limited extent immediately after the intervention, without increasing the risk or frequency of falls.

There is insufficient evidence to determine whether exercise interventions reduce fear of falling beyond the end of the intervention or their effect on other outcomes.
Yoga and Tai Chi

• Yoga may have a beneficial effect on balance, but variable study design and poor reporting quality obscure the results.
  • “A systematic review of yoga for balance in a healthy population.” Jeter PE et al J Altern Compl Med 2014

• Modified Sun style tai chi did not have an impact on impairment, functional limitations, or disability in preclinically disabled older people when delivered for 24 weeks.
  • “Impact of tai chi on impairment, functional limitation, and disability among preclinically disabled older people: a randomized controlled trial.” Day et al Arch of PM&R 2011
Exercise
Take Home Points

• Vit D and Medication review
  • Helpful in prevention for patients in care facilities (Cochrane Rev 2014)

• Interventions individually tailored to target risk factors and impairments are more effective than those applied as a standard package (UptoDate 2015)

• Interventions that promote reductions in sedentary behaviors in addition to increases in physical activity may help decrease physical frailty onset. (Song J et al Am J Pub Health 2015)