Fall Prevention and Hip Protectors

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Presenter Disclosure Information
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• No relevant disclosures

Outline

• Prevalence and consequences of falls
• Risk factors
• Screening
• Prevention and management
• Hip protectors

Prevalence of falls

• 1:3 of those over 65 fall each year
• 1:2 of those over 80
• Higher in institutional settings
Consequences of falls

• ~20% of falls result in an injury requiring medical attention
• Leading cause of death due to injury for older adults
• ~8% of falls result in fracture; most fractures due to falls
• Nursing home admission
• Fear of falling

Fatal & Nonfatal Fall Injuries Among People 65+, U.S., 2003

- ER visits for fall injuries: 1.8 million
- Nonfatal falls: NEISS-AIP, 2003
- Fall deaths: NCHS, Vital Records, 2003
% Fractures Due to Fall in Older Women

- ALL FRACTURES
- WRIST
- PROXIMAL HUMERUS
- ELBOW
- HIP
- PATELLA
- ANKLE
- FOOT/TOES
- PELVIS
- FACE
- HAND/FINGER
- THIGH/FKNEE
- HIP

Nevitt et al. 1997

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Intrinsic Factors

- Medical conditions
- Sensory impairment
- Weakness & imbalance
- Age related changes

Extrinsic Factors

- Medications
- Improper use of assistive devices
- Environmental hazards
- Risk taking behavior

Some risk factors can be modified - and falls prevented

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Guidelines for Fall Prevention

- Guideline for the Prevention of Falls in Older Persons
  - American Geriatrics Society
  - British Geriatrics Society
  - American Academy of Orthopaedic Surgeons

- JAGS 49:664–672, 2001

Single Fall

Tests of Balance and Gait

- Timed up and go test
- Turn 180°
- Performance-oriented assessment of mobility problems (Tinetti scale)
- Functional reach
- Dynamic gait index
- Berg balance scale

NICE Clinical practice guideline 2004; Perell Jour of Gerontol 2001
Recurrent Falls

Comprehensive Falls Evaluation

Often requires an interdisciplinary approach

Step 1: Take a good history
  – Circumstances
  – Frequency
  – Injuries

Step 2: Functional Status Assessment
  – Activities of Daily Living
  – Instrumental Activities of Daily Living
  – Current home health support system
  – Review of Risk Factors

Comprehensive Falls Evaluation

Step 3: Medication Review
  – “High risk” medications
    – >4 medications
    – Potential strategies to combat polypharmacy

Step 4: Physical Examination
  – Orthostatic Blood Pressure
  – Cardiovascular system
  – Neurologic system
  – Visual acuity
  – Foot examination
  – Musculoskeletal system

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Creating an Individualized Intervention

- Identify modifiable and non-modifiable risk factors
- Target treatment plan toward these risk factors
- Several effective interventions are available

Effective Interventions

- Exercise:
  - Multiple component group exercise
  - Tai Chi group exercise
  - Individually prescribed home-based program
- Multifactorial risk factor program
- Home hazard assessment & modification in higher risk
- Medications: Withdrawal of psychotropic medication; educational program for 1° care MDs
- Cardiac pacing for fallers with cardioinhibitory carotid sinus hypersensitivity
- Vitamin D may reduce falls in those with low D levels

Strength & Balance Training

<table>
<thead>
<tr>
<th>Type of exercise program</th>
<th>Pooled RR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multicomponent group exercises</td>
<td>0.78</td>
<td>(0.71 – 0.86)</td>
</tr>
<tr>
<td>Tai Chi group exercise</td>
<td>0.63</td>
<td>(0.52 – 0.78)</td>
</tr>
<tr>
<td>Individually tailored, home-based</td>
<td>0.66</td>
<td>(0.53 – 0.82)</td>
</tr>
</tbody>
</table>

Multifactorial Intervention

Components:
- Strength & balance training
- Home hazards
- Vision
- Medications

Pooled RR 0.75 (0.65 – 0.86)
Home Environment Assessment

- Outside and inside; room by room
- Clutter, cords, lighting, width of walk ways, and condition of flooring
- Grab bars for bathroom, tub bench or shower chair, non skid tub surface, raised toilet seat
- Night light in bedroom, phone and flash light next to bed
- Frequently used items in kitchen should be within reach
- Stairs both inside and outside should have adequate lighting and be free from clutter

Home Hazard Intervention

- Not effective overall:
  RR 0.90 (0.79 – 1.03)
- Reduced falls in those at higher risk:
  RR 0.56 (0.42 – 0.76)
- Anti-slip shoe device in icy conditions:
  RR 0.42 (0.22 – 0.78)

Gillespie et al. Cochrane 2009

Medication Withdrawal

- N = 93, 65+ yrs old, taking psychotropic medication
- Gradual withdrawal of medication vs continued use (double blind)
- 44 weeks follow-up
- RH: 0.34 (0.16-0.74)
- After trial, 47% of those on placebo restarted psychotropic medication

Campbell et al 1999

Medication: Educational Intervention

- 12-month intervention
  - Education (academic detailing, provision of prescribing information and feedback)
  - Medication risk assessment
  - Facilitation of medication review
  - Financial incentives
- 20 GPs and 849 patients
- RR for falls: 0.61 (0.41 - 0.91)

Pit et al 2007
Vitamin D & Falls: By initial level

Interventions with Unknown Effectiveness

- Vitamin D with or without calcium in those with adequate levels
- Home hazard modification in those without fall history
- Hormone replacement therapy
- Correction of visual deficiency

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Hip Protectors

- ~1.5 falls/nursing-home-bed-year
- 10-25% of falls lead to fx’s or hosp adm
- Purpose: prevent fractures due to falls
- Principle: deflect forces away from greater trochanteric process
Hip Protectors and Fracture
Institutional Setting

A multicenter, randomized, controlled clinical trial of an energy absorbing and diverting hip protector worn only on one side

- unique study design
- each resident (with equivalent risk of right vs left hip fracture) serves as his or her own control
- eliminates possible bias present in other studies when blinding of treatment between individual participants is not employed

Achieved overall adherence of 79%

Kiel et al. 2007

Slide courtesy of Doug Kiel MD
Cumulative Number of Hip Fractures on Padded Versus Unpadded Sides

- Padded
- Unpadded


Number of hip fractures

Kiel et al. 2007

Slide courtesy of Doug Kiel MD

Hip Protectors - Conclusions

- Not effective in community setting
- Initial evidence for effectiveness in institutional settings, but not supported with additional trials
- Wide variety of models available
- Not all tested in RCT
- Issues of acceptance and compliance

Falls - Conclusions

- Falls are central factor in fracture events.
- Falls are common in older adults.
- Reduction in falls is possible. Several approaches successfully tested in trials.
- Limited evidence on prevention of fractures or other injuries.
- Hip protectors not proven to reduce fracture risk.

Falls - Resources