Fractures in the Elderly

Prevalence and Effects on Quality of Life

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Objective

– State short-term and long-term effects of long bone and spinal fractures in the geriatric patient
How serious is the problem?
Falls with Fractures - Outcomes

- 20-30% percent of people who fall suffer moderate to severe injuries: lacerations, hip fractures, or head trauma (Sterling, O’Connor & Bonadies, 2001).

- These injuries impact the patient’s functional capacity and increase their risk of early death (Alexander, Rivara & Wolf, 1992).
Location of Falls
(65 years and older)

- Home: 60%
- Public Places: 30%
- Nursing Home: 10%
Unintentional Fall Death Rates by Gender, Age 65 +, U.S. 1996

Per 100,000

65-74 75-84 85+
Men
Women

National Center for Health Statistics, Vital Statistics
Unintentional Fall Age-Adjusted Death Rates, Age 65 +, gender and race U.S.

National Center for Health Statistics, Vital Statistics
Intrinsic (Personal) factors for Falls

- Aged (over 65 years)
- Female
- Low mobility or fragility – lower extremity weakness, and poor grip strength
- Functional impairments - limited Activities of Daily living (ADL)
- Poor gait and balance
- Low body weight
• Cognitive impairment or dementia
• Chronic illness
  - Parkinson disease, visual difficulties, stroke, hypertension, or urinary incontinence
• Psychoactive medication
  - tranquilizers or antidepressants
• Previous falls
• Heavy drinking
Fragile Bone

- Osteoporosis, or brittle bones
- Fall induced fractures

Dempster et al., JBMR 1986
Most Common Fractures in Older Adults

- Spine
- Hip
- Forearm
- Leg
- Ankle
- Pelvis
- Humerus
- Hand


# Falls and fractures

*(Colledge, 2007)*

<table>
<thead>
<tr>
<th>Type of fracture</th>
<th>Percentage attributed to falls by older women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrist</td>
<td>96</td>
</tr>
<tr>
<td>Proximal Humerus</td>
<td>95</td>
</tr>
<tr>
<td>Hip</td>
<td>92</td>
</tr>
<tr>
<td>Ankle</td>
<td>88</td>
</tr>
<tr>
<td>Pelvis</td>
<td>80</td>
</tr>
<tr>
<td>Face</td>
<td>77</td>
</tr>
<tr>
<td>Tibia / fibula</td>
<td>65</td>
</tr>
<tr>
<td>Vertebral</td>
<td>&lt;25</td>
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</tbody>
</table>
HIP FRACTURES
Epidemiology and Demographics

- Hip fracture 2\textsuperscript{nd} leading cause of hospitalization.
- 300,000 annually in US - 90% from falls.
- Women sustain 75% of all hip fractures.
- People age 85 years or older are 10-15x more likely to sustain hip fractures than age 60-65 [National Hospital Discharge Summary, 2011].
- Age-"adjusted incidence is increasing: frail elderly at risk for hip fracture will double; in US by 2040 to 840,000 annually. [Marks et.al., 2002].
50% hip fractures patients lose ability to function independently [Gantz et al., 2007].

1 in 3 remain in nursing home for at least a year after their injury [Liebson et al., 2005].

1 out 5 hip fracture patient dies within a year of injury [Farahmand, BY et al., 2005].
Epidemiology and Demographics

- Fastest growing US population: over 65 (20% by 2025)
- Life expectancy at age 65: 18.9 years; 75=11 yrs; 85=7 yrs
- 10% people over age 90 will live to 100
- Increased incidence with increased age — 4% in men age 64-69, 31% risk in men over age 90
- Women over age 50: 15% lifetime risk hip fracture

Epidemiology and Demographics

• Bad Predictor
  – Increased mortality
    • No significant decline in mortality since 1980s
    • 20% mortality over first year
  – Decreased functional status
    • 30% survivors discharged to skilled nursing facility

Hip Fractures Classified by Location

1 - Femoral neck region

2 - Intertrochanteric region

3 - Subtrochanteric region
Model of Key Risk Factors in HIP FRACTURE
(Marks et.al., 2003)

- Subnormal bone mass
- Subnormal bone quality
  +
  - Bone safety threshold exceeded
    +
    - Hip fracture
    - Falls to side
      - Muscle weakness
      - Impaired balance
      - Other fall risk factors (drugs, comorbidities)
MUSCLE WEAKNESS in Hip Fracture Disability
[Marks et.al., 2003]

Age
Depression
Impaired health
Impaired vision
Impaired nutrition

Osteoporosis

Muscle Weakness

Hip Fracture

Loss Function

Further Weakness

Further Osteoporosis

Further Injury/fracture
At present, we face not only an increasing number of fractures of the hip, but more demanding and complex fractures in older patients than a decade ago.

LTC Admission and Falls

- People age 75 and older who fall are four to five times more likely than those age 65 to 74 to be admitted to a long-term care facility for a year or longer.
- One in three adults who lived independently before their hip fracture remains in a nursing home for at least a year after their injury.

*Liebson, Toteson, Gabriel, Ransom, and Melton, 2002*
SPINAL FRACTURES

BURST FRACTURE

WEDGE FRACTURE
Risk Factors for Spinal Fractures

Non-modifiable risk factors

1. Age and female gender
2. Caucasian race
3. Dementia
4. History of falling
5. History of fractures in adulthood
6. History of fractures in a first-degree relative

Risk Factors for Spinal Fractures

**Modifiable**

1. Abusive situation
2. Alcohol/tobacco use
3. Osteoporosis and/or estrogen deficiency
4. Early menopause
5. Frailty
6. Impaired eyesight
7. Insufficient physical activity
8. Low body weight
9. Deficiency of calcium and/or Vitamin D in diet

*Old & Calvert, 2004*
Etiology of Spinal Fractures in the Elderly

- Weight of the upper body exceeds the ability of the bone of the vertebral body to support the load
- 30% of compression fractures occur when in bed
- Minor trauma (stepping out of the bathtub, vigorous sneeze, picking up a small object, misstep)
- Fall or other trauma

Old & Calvert, 2004
Complications of Spinal Fractures in the Elderly

- Constipation
- Bowel obstruction
- Prolonged inactivity
- DVT
- Increased osteoporosis
- **Progressive muscle weakness**
- Loss of independence
- Kyphosis and reduced height
- Crowding of internal organs
- Atelectasis and pneumonia
- Prolonged pain
- Low self-esteem
- Emotional and social problems
- Increased nursing home admissions
- Mortality

*(Old & Calvert, 2004)*
References