Hip Fracture Update

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Incidence

• Second leading cause of hospitalizations in the elderly
• 390,000 new hip fractures per year
• predicted to double by 2050
  – At risk populations
    • Elderly: poor balance & vision, osteoporosis, inactivity, medications, malnutrition
    • higher in white population
    • Other factors: smokers, small body size, excessive caffeine & ETOH
Incidence

- Average age at occurrence 77 years for women
- 72 years for men
- Fracture rate doubles for each decade after 5th decade

Historical Treatment

- Traction and cast resulted in a 30% union rate
- Mortality rates as high as 60%
- More than 50 different types of nails, screws, plates or pins have been designed to “fix” these fractures
History and Exam

• History
  – Cause of Injury – Fall.
  – Ambulatory Ability
  – Functional Status
  – Mental Status
  – Ability to Participate in a Rehabilitation Program
  – Associated Medical Problems
  – Prior Hip Pain
  – Review medications as a cause of fall

• Physical Exam
  – Associated Injuries (Femoral Shaft Fractures)

Initial Evaluation

• Exam reveals leg that is short externally rotated and painful with attempts at motion
• NV exam
• Careful examination of heart, lungs, mentation
• Assessment of premorbid function and support system
**Initial Evaluation**

- Lab to include CBC, Renal panel, Nutrition profile, UA, PT/INR
- EKG
- CXR
- AP Pelvis and lateral of the hip
- MRI is gold standard to detect occult fxs
  - 100% sensitive and specific

**Initial Management**

- Rapid reversal of treatable conditions (ie CHF, A-fib, dehydration, electrolyte imbalance)
- Nutritional supplementation
- Beta Blockade
- DVT prophylaxis
- Judicious use of pain meds
- Traction?
  - No difference in analgesic use
  - Pressure sore/ skin problems
  - Increased cost
  - No effect on fracture reduction
Decisions

- Surgery vs pain control
- Timing of surgery
- Anesthetic choices
- Operative fixation choices
- Post op management
- Disposition / Rehabilitation
- Prevention

Surgery or Not

- Surgical treatment is superior in non-institutionalized patients and is the standard of care
- Controversy exists as to the management of non-ambulatory patients and those who are severely demented
Timing of Surgery

• There is some controversy, with literature to support surgery within 24 hours vs delay of 48 hrs
• The majority of the literature supports surgery as soon as rapidly treatable conditions are stabilized

Timing of Surgery

• Operate when medically stable
• Timing of surgery and risk of avascular necrosis in femoral neck fractures
• Young (age less than 60)– SURGICAL EMERGENCY
Mortality Statistics

Mortality in Elderly Patients
- Women
  - 6-10% 1st 30 Days
  - 17% 1 year
- Men
  - 16% 1st 30 Days
  - 31-42% 1 year

Predictors of Mortality
- Age > 85 yrs
- Nursing Home Resident
- Male
- COPD, CAD
- Renal Failure with Cr > 1.7
- Prefracture inability to ambulate
- More than 2 medical comorbidities
Anesthetic Options

- Regional vs General
- No difference in terms of mortality, blood loss, cardiac events
- Lower rate of thromboembolism and pneumonia with regional
- Less delirium with regional

ANTICIPATE & PREVENT

**Malnutrition**
- 20% severely malnourished
- Dietary consult
- Nutritional supplements between meals or with meds
- Speech therapy in more resistant feeders.

**Protein supplement**
- Increased albumin
- Reduced complications
- Reduced LOS

**Falls evaluation**

**Delirium prevention**
- Hip surgery - 60%
- Appropriate prevention
  - 33% reduction in primary delirium
  - 50% reduction severe delirium
Medication Review

ACUTE CHANGES IN MS mnemonic

- A ntiparkinsonian
- C orticosteroids
- U rologic (antispasmodics)
- T heophylline
- E mesis (antiemetics)

Look for any medication that SEDATES the Patient or CHANGES NEUROTRANSMITTERS

- C ardiac (antiarrhythmics)
- H 2 blockers (cimetidine)
- A nticholinergics
- N SAIDs
- G eropsychotropic
- E toh
- I nsomnia drugs
- N arcotics
- M uscle relaxants
- S eizure meds.

Operative Choices

- Surgical choices depend on fracture classification
- Three general classes- Femoral Neck, Intertrochanteric, and Subtrochanteric
Anatomy of the Hip

Posterior View  Anterior View
Femoral Neck Fractures

• Garden classification

“Displaced” versus “Nondisplaced” Classification

• Inter-observer Agreement
  – Frandsen et al (1988) -- When divided into Garden I/II and Garden III/IV, inter-observer agreement increased from 22 to 67 percent.

• Outcome Prediction
  – AVN -- < 8% in nondisplaced and 15-33% in displaced
  – Nonunion -- < 5% in nondisplaced and 10-30% in displaced
Fixation Versus Replacement

- **Internal Fixation**
  - Nonunion
  - Avascular Necrosis
  - Fixation Failure

- **Arthroplasty**
  - Loosening
  - Acetabular Erosion
  - Dislocation
  - Infection

(Rodriguez-Merchan, 2002)

Fixation Versus Replacement

- **Internal Fixation**
  - Shorter hospitalizations
  - Shorter OR time
  - Decreased transfusions
  - Decreased post-operative morbidity
  - Lower costs

- **Arthroplasty**
  - Earlier mobility
  - Fewer re-operations
  - Better functional results at 1 year

Although the mortality for hemiarthroplasty is higher in the first month, the rates are not significantly different beyond 3 months.
Femoral Neck Fractures

- Stable Garden I and II
Nonunion

Osteonecrosis (AVN)
Femoral Neck Fractures

- Unstable Garden III and IV
- Endoprosthetic or THA replacement
Total Hip Arthroplasty
Endo vs THA
Endo vs THA

- **Endo**
  - Faster
  - Stability
  - Pain
  - Older patients
  - Nursing home
  - Non community ambulaters

- **THA**
  - Longer OR times
  - Less stable?
  - Less pain
  - Younger
  - Active
  - Community ambulators

Cemented vs Bone Ingrowth stems

- OR time
- Fracture
- Cemented initially
- Ingrowth recently
- Back to cemented?
Intertrochanteric Hip Fractures

- Internal fixation with sliding screw plate
Troch nail
SUBTROCHANTERIC FEMUR FRACTURES

TWO MAIN CHOICES IN TYPE OF IMPLANT

• Extramedullary devices

• Intramedullary devices
**95° DCS or BLADE PLATE**

- Better for fractures without greater trochanter fx
- Short oblique or transverse fractures

**INTRAMEDULLARY NAILS**

**ADVANTAGES**
- Less soft tissue stripping
- Decreased stress on implant
- Fewer nonunions
- Lower infection rate
- Earlier Weight Bearing

**DISADVANTAGES**
- Difficult to insert
- May not support proximal fragment
- Varus and rotational malunion
Post Operative Management

- Balance of intake and output
- Nutritional supplementation
- Beta Blockade (perioperative)
- Maintain Hgb
- Pain Control
- Pulmonary Toilet
- Monitor Skin
- DVT Prophylaxis
- Mobilize
Pain Management

ACETAMINOPHEN
- lowest side effects
- use as scheduled does for greatest effect
- 650mg qid
- Compatible with NSAID’s & opiates.
- Total dose less than 3 gms/24 hours
- When on scheduled dose acetaminophen; *AVOID* acetaminophen/narcotic combinations as prn’s.

Pain Management
- **Can add** prn narcotics
- Tramadol
- **Morphine sulfate or Hydromorphone**
- **Hydrocodone or Oxycodone**
Thromboembolism

- Incidence 40-70% depending on the screening modality
- Rate of DVT 10-30% with prophylaxis
- Symptomatic PE 4-7% without prophylaxis
- Symptomatic PE 0.3% with prophylaxis

DVT Prophylaxis

- Coumadin, LMWH, and other oral anticoagulants
- Mechanical compression
- ASA
- Unfractionated SQ Heparin less effective
- Duration of therapy is controversial but 14 days to 4 weeks
Disposition/ Rehabilitation

- Goal is rapid return to premorbid ambulatory status
- This is predicated upon management of medical conditions, stabilization and healing of the fracture and avoidance of complications

Rehabilitation

- Fracture should be stabilized to allow for rapid mobilization and ideally weight bearing as tolerated.
- Gait studies show that patients self select an appropriate level of weight bearing
Negative Predictors of Ambulation

• Age > 85 yrs
• Lack of social support
• Lower extremity contractures
• Preoperative ambulatory status
  – Only 40% will resume premorbid status

Disposition

• 80% will be discharged to somewhere other than home
• 40% of these will remain institutionalized permanently
Predictors of Discharge to Institution

- Age >85
- Inability to ambulate
- Dementia
- Inability to transfer
- Fecal incontinence
- Pressure sores
- Poor social support

Osteoporosis Risk Factors

- Age
- Female
- Postmenopausal
- Low estrogen
- Thin
- Fair
- Disease
- Diet
  - Low calcium
  - ETOH
- Family history
- Steroids
- Anticonvulsants
- Hyperthyroidism
- Diabetes
- Previous Fractures
Bone Mass

- Important determinant of future risk
- 95% by age 16
- Peaks by age 26
- Losses are often permanent

Hip Fracture as Risk Factor

- Papaioannou 2001, J Bone Min Res 15supp: SA326
- 9.9% have another fracture within a year
- 5.2% have another hip fracture within a year
- 30% eventually have another hip fx
Hip Fracture as Risk Factor

- 10-15% will have another fracture of the same femur

Osteoporosis

[Diagram showing INJURY, DISUSE, and OSTEOPOROSIS]

OSTEOPOROSIS
Osteoporosis Treatment

- Treatment reduces fracture risk 50%
- Treatment of patients at risk
  - Calcium and Vit D
  - Bisphosphonates
    - Alendronate (Fosamax)
    - Risedronate (Actonel)
    - Etidronate (Didronel)
    - Pamidronate (Aredia)
  - Raloxifene (Evista)

Osteoporosis Strategies

- Fracture Treatment
  - Maximize weight bearing
  - Avoid bed rest (1% bone mass loss per week)
  - Treat as a pathologic fracture
  - Medical management in almost all
Prevention

• Hip pads
• Avoid throw rugs, install rails
• Assistive devices
• Osteoporosis prevention/treatment
• Avoid mind or balance altering medications
• Assess for postural hypotension
• Gait training, strengthening, and balance exercises

Rehabilitation

• Physical therapy
• For ORIF of displaced femoral neck fractures, protected weight-bearing for up to twelve weeks
• For ORIF of stable fxs WBAT, but will usually use assistive devices for 8-12 weeks
Return to Work

- Desk work usually at 6-8 weeks
- Standing work 3 months or longer
- Heavy manual labor
  - ORIF
  - THA

Long term concerns

- ORIF femoral neck fx
  - AVN
  - Painful hardware
  - Leg Length discrepancy
- ORIF IT fx
  - Painful hardware
Long term concerns

- Endoprosthesis
  - Loosening
  - Pain
  - Infection
- Total Hip Arthroplasty
  - Wear
  - Loosening
  - Infection
  - Dislocation

Summary

A multidisciplinary approach including primary care physicians, anesthesiologist, OR team, orthopaedist, physical and occupational therapist can and has improved the outcomes in geriatric patients with hip fractures. However, the mortality and morbidity rates remain high.