Femur Fractures

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Goals

- Review basic current treatments for femur fractures by location.
- Highlight the AAOS hip fracture guidelines.
- Avoid pitfalls of certain fractures patterns.

Hip fractures alone...

- 350,000 in US last year (1.6 million world)
- 8.9 fragility fractures worldwide each year
- Expected to double by 2050 as the over 65 population is expected to boom.
The cost of hip fracture care ~$37,000 per patient!

CDC DATA.

Hip Fracture Cost

30 billion dollars per year

Hip fractures

CDC DATA 2010.

By 2020, the annual direct and indirect cost is expected at $54.9 billion (in 2007 dollars)

- Lost wages/ productivity
- Long Term Care
Obamacare?

Bed rest or…

Traction

Hip & Femur Fracture

- Pain/disability
- Fat emboli
- Pneumonia
- DVT/ PE
- Ulcers
- UTI
- Death
**Hip & Femur** Fracture stabilization

- Bone healing
- Soft tissue healing
- Extremity care
- Decreases morbidity of “fracture disease”
- Decreases pain
- Decreases narcotic use

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**Early Stabilization & Mobilization**

**AVOIDS**

- Pneumonia
- ARDS
- Atelectasis
- Pneumonia

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**Non-Operative Treatment**

- Reserved for patients with co-morbidities that have unacceptable risks associated with surgery/anesthesia.
Clinical Practice Guideline Summary

Management of Hip Fractures in the Elderly

No pre-op traction
MRI

Imaging of choice for presumed hip fracture

Operative fixation for stable hip fx

Non-displaced
Young and old...

Major risk is displacement!

Displaced Femoral Neck Fractures
in the Young
Femoral neck fractures:

- Greatest “hopeful” potential outcome
- Less cost initially / “less surgery”
- Increased incidence of revision surgery
Femoral Neck Anatomy

- Profunda femoral
- Extracapsular ring medial & lateral circumflex
- Ascending branches lateral epiphyseal
- Foveal artery

Arthroplasty - displaced/ unstable

Femoral neck fractures

“Middle” Age Arthroplasty?

- Health
- Delay in surgery
- Osteopenia
- Unable to achieve reduction
- Comminution posterior neck or calcar
Arthroplasty - Summary

- Larger surgery, increased operative time and anesthesia
- Increased risk of infection and dislocation
- Less likely additional surgery.
- More cost effective
- More reproducible outcome

Femoral neck fractures:
Higher dislocation rate
- with posterior approach

Unipolar vs Bipolar
Outcomes are similar!
Preferential use of cemented stems for arthroplasty - moderate


Frail Elderly Cardiovascular

AVOID

Cement

THA vs Hemi:

There is a benefit of THA in properly selected patients with unstable neck fractures

- Lower pain scores
- Lower revision rates
- Mortality unaffected

Bias toward higher functioning independent community ambulators
History: Groin Pain - DJD?

THA for treatment of femoral neck fractures

- DJD
- “High Expectations”
- Rheumatoid Arthritis
- THA on the “other side”
- Revision Surgery- failed ORIF/hemiarthroplasty
Acetabular Reaming

It’s not DJD…

- Ostepenia
- Thin medial wall
- Subcondral bone

The incidence of nonunion...

70°
Either sliding hip screw or cephalomedullary device in **stable** intertrochanteric fractures

Cephalomedullary device (IM nail)

**Unstable** Intertrochanteric Fractures
Cephalomedullary device
Subtrochanteric / Reverse Intertrochanteric

Reverse Obliquity Intertrochanteric Fractures

Subtrochanteric Fractures
The incidence of cut-out has ranged from 6 to 19% in unstable fractures.

Reduction is key!
Tip to Apex distance

Baumgaertner, et al JBJS 77A & 79B.

Efforts to avoid delirium critical to achieving good outcome

TEAM APPROACH

- Pre-op regional anesthesia
- Multimodal pain control
- Minimize delay
- Early mobility
- Nutritional support
- Interdisciplinary support
- Intensive PT
Surgery within 48 hours improves outcome.

Medical/Cardiac Clearance

- Historically:
  - Cleared vs Not cleared (too sick for surgery)
  - needs echo or stress test further work up

- Now:
  - Risk Stratification
  - High Risk: “You’re going to do surgery anyway”

- Future: Hip Fracture Team

Revised Cardiac Risk Index

- Known CAD
- Insulin tx DM
- Renal insufficiency Cr>2.0
- CHF
- CVA
- HTN

Risk of cardiac death, nonfatal MI, and nonfatal cardiac arrest:

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<th>Risk Probability</th>
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<tr>
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<tr>
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</tr>
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<td>≥3</td>
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</table>
Revised Cardiac Risk Index


Lee, et al. (1999). *Circulation*


Do not delay surgery for ASA or Clopidogrel (Plavix)

Pre op regional anesthesia improved pre op pain control

觱 Efforts to avoid delirium critical to achieving good outcomes!
Nursing Care - Hip Fractures

- Foley
- IVF fluids
- Incentive Spirometry

VTE prophylaxis

- Given risks; prophylaxis should be used.......

Nursing Care - DVT Prophylaxis

- Hydration
- Anesthesia
- TED Stockings
- Foot Pumps/SCD
- Early mobilization
- Exercises
- Pharmacology
Blood Products

- Type and Screen
- Type and Cross
- FFP?

Blood Transfusion

- Threshold of no higher than 8g/dl in asymptomatic post operative patients

Similar outcomes:

- for general and spinal anesthesia
Postoperative Multimodal Analgesia

- Local anesthetics
- Regional anesthetics
- Epidural anesthetics
- Relaxation techniques
- Pain protocols

Rehabilitation

- Interdisciplinary Care
- Nutrition Supplementation
  - reduces mortality and improves outcomes
- Occupational & P.T.
  - improves functional outcomes and fall prevention

Falls Prevention
Osteoporosis Evaluation and Treatment

- Moderate evidence supports that patients be evaluated and treated for osteoporosis.

Calcium and Vitamin D

- Moderate evidence recommended
- No specific dose recommendations
  - Bishoff, Ferrari et al. 2000 IU Vitamin D
  - Decreased hospital readmission by 39%
- ? 800 IU Vitamin D/1200mg Ca
  - Munier 1996

Femoral Shaft Fractures
**Associated injuries**

- Head
- Thoracic
  - pneumothorax
  - pulmonary contusion
  - aortic disruption
- Abdominal
  - spleen / liver lacerations
- Spinal cord
- Pelvis fractures

**Vascular injuries**

- Locked Antegrade Piriformis fossa
- 99% union rates
- Low rate of complications

Brumback JBJS1988
Antegrade Nail  Piriformis fossa

Trochanteric Entry Nail
Retrograde Femoral Nails

Antegrade vs. Retrograde

- **No difference in**
  - Operating time, blood loss, complications,
  - Size of nail, transfusion requirements

- **Tornetta P. III, et all; JBJS (Br) 2000**

Antegrade vs. Retrograde Comparisons

- **Equal union rates**

  - **ANTEGRADE**
    - More hip and proximal thigh pain
    - Greater incidence of Trendelenburg gait
  
  - **RETROGRADE**
    - More knee pain
    - Symptomatic distal hardware
    - Higher dynamization rates with small diameter nails

- **Ostrum, JOT, 2000**
- **Ricci, JOT, 2001**
Periprosthetic Shaft Fractures

LOCATION classification

A

B

C

Satisfied with hip replacement?

Osteolysis

Stable or loose implant
Bone Biology is altered
- Stable Fixation
- Balanced fixation
- Proximal fixation is key
- Screw Fixation is preferable
- Augment ?
  -additional plate or allograft

Circlage alone is ineffective!
Unicortical screws?

Don’t get fooled

Stress Risers

Plate length???
Conclusion

- Hip fractures will reach epidemic proportions.
- Surgery for the fractured femur leads to a more predictable optimal outcome.
- Team approach to management of hip and femur fractures will improve outcomes and hopefully reduce cost.
- Don’t forget DVT prophylaxis

The End

Thank you

Allegheny Orthopedics