Femoral Neck Fracture

- Often called “hip fracture”
- Also consider femoral intertrochanteric fracture, hip dislocation, or pelvic fracture on differential

Risk factors:
- Non-modifiable: age, sex, ethnicity
  - Age: approx. 60% occur in patients >75 yrs
  - Sex: higher incidence in females vs. males
  - Ethnicity: Among females, 2:1 ratio European American vs. African Americans
- Modifiable: alcohol/caffeine consumption, smoking, malnutrition, body weight < 90% of ideal, meds: steroids, antipsychotics, benzodiazepines

Physical exam:
- May see ipsilateral leg shortened and held in external rotation
  - Complete femoral neck fracture
    - Greater trochanteric muscles still attached
    - Abductors/external rotators have strong proximal pull, no longer constrained to acetabulum by femoral head/neck

X-ray views: 1) Hip/Pelvis AP, 2) hip AP with traction-internal rotation, 3) cross-table lateral, 4) full-length femur

Hip Fracture Classification:
- Hip fractures can be subcategorized anatomically: intracapsular (femoral head or femoral neck) and extracapsular (intertrochanteric and subtrochanteric)
  - Garden classification, often used to describe fracture and guide treatment:
    - Stage I: Incomplete, nondisplaced
    - Stage II: Complete, nondisplaced
    - Stage III: Partially displaced w/ joint capsule likely intact
    - Stage IV: Completely displaced w/ joint capsule likely disrupted

  - Garden classification to guide treatment:
    - Stages I and II, nondisplaced, may be treated with surgical pin(s) across fracture site (e.g., inverted triangle) or cannulated hip screw.
    - Goal: Create compression across fracture with sufficient stability to preserve native blood supply. (Patients likely cleared for early rehab w/ partial or full weightbearing.)
    - Stages III and IV: treatment typically involves hemi or total arthroplasty. Higher concern for damaged blood supply and avascular necrosis.
    - (Patients can function similar to elective hip replacements with early ambulation, if stable arthroplasty and no associated acetabular fractures).

Blood supply to femoral head: Depends on patient’s age.
- At birth up to ~4 years old: Artery of the ligamentum teres and lateral femoral circumflex artery.
- After age 4: Contributions decrease, and main blood supply becomes posteroinferior and inferior retinacular branches of medial femoral circumflex artery.

Post-hip fracture Repair Precautions:
- Venous thromboembolism (VTE) prevention:
  - Risk of pulmonary embolism tends to be highest 2nd and 3rd week post-operatively (or during the time the patient is likely admitted to inpatient rehabilitation).
  - 2012 American College of Chest Physician guidelines: low molecular weight heparin or direct oral anticoagulants, at least 10-14 days following surgery (suggestion to extend up to 35 days).
- Post-operative rehab: Anterior vs. Posterior Approach
  - Anterior approach: precautions include no excessive hip extension or external rotation
  - Posterior approach: higher risk of dislocation than anterior approach. Limit hip flexion > 90°, adduction post-midline, hip internal rotation. (No sitting on low chairs/toilets, flexing at waist to reach floor.)

Femoral Neck Stress Fracture

- Other differentials (e.g., for young runners): hip impingement, labral tear, adductor/hip flexor strain

Risk Factors/at-risk population: Malnutrition/osteoporosis, endurance athletes, military recruits, individuals w/ history of osteoporosis/osteopenia, or recent rise in training program, “Female athlete triad” (disordered eating, amenorrhea, osteoporosis)

Imaging: MRI of the hip → MRI can detect marrow edema, low signal intensity on T1 and T2, and cortical fissures. (Similar to osseous stress fractures/vascular defects, radiographs will usually be negative early in course.)

Two Types of Femoral Neck Stress Fractures:
- Compression, inferior-median aspect of neck (more stable) vs. tension, superior-lateral aspect of neck (more unstable and greater chance needing percutaneous screw fixation). Both have risk for fracture progression w/ possible displacement, varus deformity, and avascular necrosis.
- Other high-risk stress fractures: anterior tibial (most common) patella, anterior cortex of tibia, medial malleolus, foot (talus, navicular, proximal 4th/5th metatarsal, great toe sesamoids). Don’t forget lumbar pars interarticularis!

Stress fracture prevention: Educating proper training techniques and appropriate progression of frequency/intensity, proper bone health with adequate calories, calcium, vitamin D, regular weightbearing.

TAKEAWAYS!
- Quick identification of a hip fracture is important.
- Physical exam: Shortened, externally rotated if displaced.
- Suspicion rises with age and those with osteoporotic risk factors, including female, alcohol, caffeine, or smoking, meds (e.g., steroids, antipsychotics, and benzodiazepines, malnutrition), and low body weight.
- Traumatic and stress hip fractures require urgent evaluation for surgical consideration. High risk of femoral head avascular necrosis. The head’s tenuous blood supply is primarily through the medial femoral circumflex artery.
- Don’t forget VTE prophylaxis! Chest physician guidelines are low molecular weight heparin or direct oral anticoagulants for up to 35 days post-operatively.
- Femoral neck stress fractures are categorized as compression-type (on the inferior-median aspect), or tension-type (on the superior-lateral aspect of the neck). Tension-type are considered more unstable.
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Garden Classification

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Post-operative Rehabilitation

- **Anterior approach**: precautions include no excessive hip extension or external rotation
- **Posterior approach**: higher risk of dislocation than anterior approach, greater risk of dislocation with hip flexion >90°, education past midline, internally rotating hip. (No sitting on low chairs/toilets, flexing at waist to reach floor.)