EM CASES SUMMARY

Episode 219 Hip Emergencies

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Why hip fractures cause significant morbidity and mortality in the elderly

Hip fractures are not isolated events in older patients. They often occur in patients with low physiologic reserve and comorbidities, and once older adults begin falling, falls beget falls; the fall itself may be a sign that independence and quality of life are already threatened. The high mortality is driven less by the bone injury itself than by what can follow secondary to immobilization: delirium, pneumonia, venous thromboembolism, pressure injuries, myocardial infarction and deconditioning.

Time-to-OR targets for hip fractures

The evidence suggests best outcomes when surgery is performed within 24 hours. Outcomes worsen after 24-48 hours. There is no demonstrable benefit to targeting surgery within 6-12 hours.

Preventing delirium and delays to OR for hip fractures

Our role in the ED is to expedite pre-OR requirements, and to prevent and remove barriers that would delay the OR. Delirium prevention is critical to improve outcomes for these patients.

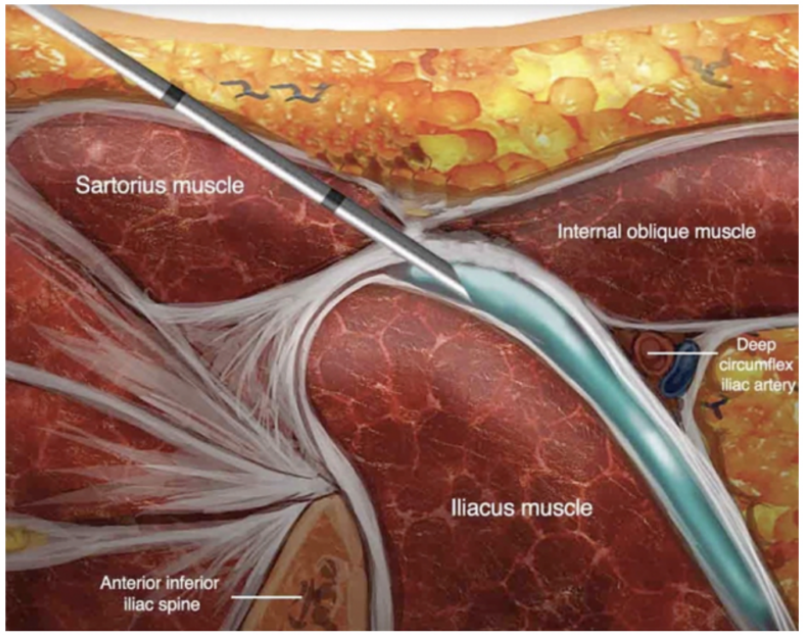
Steps we can take in the ED to prevent delays to OR:

ED step	Practical details
1. Immobilize comfortably	Position with pillows; avoid painful traction. Check pressure areas early and protect heels/sacrum.
2. Pre-op investigations	CBC, electrolytes, Ca/Mg/Ph, renal function, INR, ECG and type & screen. Correct what is fixable, but do not drift beyond the surgical window for marginal issues.
3. Clarify anticoagulants immediately	Document the exact last dose of warfarin, DOACs, aspirin or clopidogrel. If warfarin reversal is needed, start early.
4. Make the patient NPO early	If a hip fracture is suspected, make the patient NPO and document timing.
5. Block early, use multimodal analgesia	Femoral nerve or fascia iliaca block reduces opioid requirements and helps prevent delirium. Be cautious in young patients with subtrochanteric/femoral shaft fractures where pain may be needed to detect compartment syndrome.
6. Start delirium prevention in the ED	Glasses, hearing aids, hydration, reorientation, avoid benzodiazepines and anticholinergics, minimize unnecessary Foley catheters and keep family/caregivers involved for consent, collateral history, and orienting patient.

If the patient needs to be transferred to a different facility for surgery this process should start immediately upon diagnosis.

Optimizing analgesia in hip fractures: multimodal analgesia including regional nerve blocks

- Minimize the use of opioids as these are a major driver of delirium.
- Evidence suggests **femoral nerve blocks or fascia iliaca blocks** provide effective analgesia and are associated with decreased opioid use.
- Consider making hip block kits with all the supplies in one place for your ED to decrease barriers to performing this procedure.
- Avoid a dense regional block in younger patients with subtrochanteric or femoral shaft fractures where compartment syndrome is a concern, because a block could mask evolving pain.
- **Procedural Tip:** Pressing firmly, hold your hand on the hip a few centimetres below your block for 5 minutes to concentrate the block around the femoral nerve and minimize inferior spread.



Fascia iliaca block. Source: NYSORA.com

Historical clues that raise suspicion for occult hip fracture despite a normal x-ray

- Older adult with low-energy fall, especially a sideways fall onto the painful side.
- Sudden groin pain before the fall
- Persistent groin or anterior thigh pain, night pain, or pain out of proportion to the x-ray.
- New limp, shortened stride, inability to manage stairs or rise from a chair, even if the patient can take a few steps. Patients with non-displaced femoral neck fractures and valgus-impacted fractures may present with a limp or partial weight bearing.
- Past history of osteoporosis, chronic steroid use, long-term bisphosphonate use, inflammatory disease, immunosuppression, anticoagulation or multiple/recent falls.
- Knee pain that cannot be reproduced at the knee on exam points to a more proximal or distal source of pain.

Mechanism of injury can seem minor in older adults with hip fractures

We often assume that it is a fall that causes the hip fracture. In older patients, the sequence can be reversed: the patient pivots on an arthritic, stiff hip; range of motion stops; rotational force is transferred to osteoporotic bone; the hip fractures; pain causes the fall. The patient may tell you they turned, felt or heard a crack, then fell because of pain. Do not dismiss the potential for hip fracture because the fall seems minor or because the patient did not clearly

land on the hip. In older adults, low-energy or even no-clear-trauma hip fractures occur not infrequently.

Physical exam tools to diagnose occult hip fractures in the ED

Maneuver	How to perform	Interpretation / pitfall
Gentle passive internal rotation	Flex the hip slightly and internally rotate gently. Stop if it reproduces deep groin/proximal thigh pain.	Most useful bedside clue for intra-articular fracture, but not specific: OA flare, AVN and septic arthritis can also cause pain with IR.
Log roll	With the leg relaxed and knee extended, gently roll the leg side to side.	Pain with minimal rotation suggests intra-articular pathology; preserved painless rotation makes fracture less likely. Sensitive test but not specific.
Axial load / heel tap	Apply only minimal longitudinal pressure or tap through the heel.	Supportive if it produces groin/proximal thigh pain. Avoid if obvious deformity because of displacement risk.
Active straight leg raise	Ask the patient to lift the leg off the bed. Compare sides.	A painless, symmetric straight leg raise argues against major hip/pelvic/lumbar injury. Pain can point to pelvic ring or proximal femur pathology.
Patellar-pubic percussion test	Patient lies supine with legs extended and relaxed. Stethoscope over pubic symphysis, tap each patella and compare transmission. Decreased transmission on affected side is suggestive of fracture.	Useful adjunct when x-rays are normal, and suspicion remains. Operator dependent and less useful with bilateral injury or poor sound transmission.

Practical bedside sequence to examine for hip/pelvic pathology: inspect for deformity and bruising; locate the pain; gently log roll; gently internally and externally rotate; assess active straight-leg raise; consider axial load only if not obviously deformed; and examine the pelvis.

Bruising pattern can also help with diagnosis. Bruising over the greater trochanter should raise concern for subcapital fracture or acetabular injury. Bruising around the knee may mean the patient fell onto the knee and transmitted force up the femur into the hip. Absence of bruising does not rule anything out.

Pearl: *In areas with limited access to CT, altered sound transmission on patellar-pubic percussion is a useful data point to support transfer for advanced imaging.*

Patellar-pubic percussion test

Clinical clues to distinguish hip fractures from pelvic fractures

Pelvic ring injury becomes more likely when pain is more medial, with tenderness over the pubic symphysis, sacrum or iliac crests, or pain with pelvic compression. Hip fracture becomes more likely with focal hip pain, deep groin pain, lateral hip tenderness

over the greater trochanter after a fall, and pain with hip rotation or log roll.

Low-energy pubic rami fractures are common and often nonoperative, but missing them still matters for analgesia, mobility planning and avoiding bounce backs.

Pitfall: *Missing the second fracture: hip and pelvic fractures can co-exist.*

Hip Fractures Occult to X-ray: CT or MRI?

A normal x-ray lowers the likelihood but does not eliminate the possibility of hip fracture. Roughly 2-10% of hip fractures are radiographically occult.
If clinical suspicion remains high after a normal x-ray (i.e. persistent groin pain, inability to bear weight, abnormal gait, pain with internal rotation or log roll), obtain advanced imaging.

CT is fast and available and is often the practical first test. Modern multi-slice CT can pick up cortical fractures, displaced fractures, acetabular injuries, subchondral insufficiency fractures and peri-prosthetic complications, but it can still miss diagnoses that MRI can pick up: non-displaced femoral neck fractures, intertrochanteric extension of greater trochanter fractures, early marrow edema, and subchondral fractures.

MRI remains the gold standard when suspicion remains after negative CT and/or normal labs, especially in older patients with persistent inability to walk, deep groin pain, pain with internal rotation, or pain with minimal to no trauma. If MRI is not available promptly, do not simply discharge the high-risk patient because CT is negative. Admit or arrange a safe non-weight-bearing plan and repeat/advanced imaging according to local resources.

Pearl: Subchondral insufficiency fracture *is essentially a stress fracture of the hip in older adults. Risk factors include sports that repetitively load the hip, and factors associated with poor bone quality like smoking, alcohol use and chronic steroids. It may present with acute groin pain, normal x-rays and pain with internal rotation without major trauma. It is often diagnosed only on CT/MRI.*

Approach to atraumatic hip pain in the ED

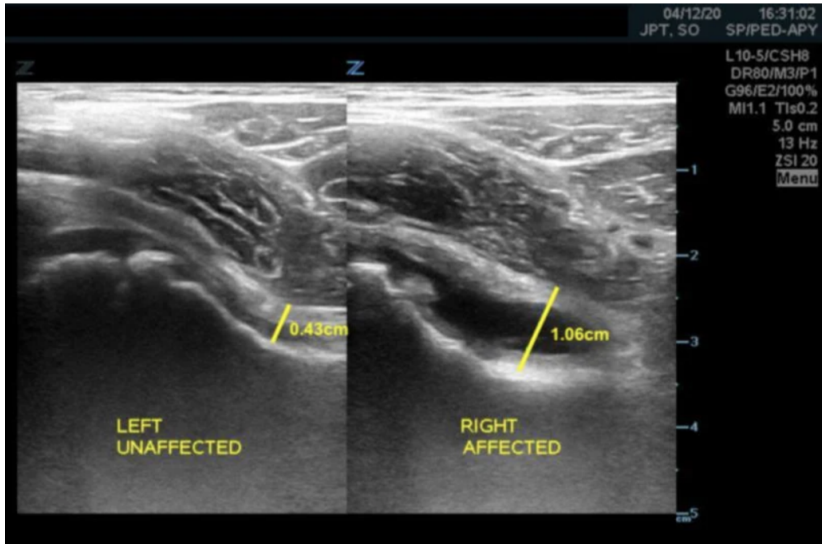
Not all atraumatic hip pain in older adults is osteoarthritis. Focus on duration of pain and localization to narrow down the diagnosis.

Pattern	Diagnoses	ED clues
Deep groin pain + pain with passive rotation	Occult femoral neck/intertrochanteric fracture, OA flare, AVN, subchondral insufficiency fracture, septic arthritis	Persistent pain despite normal x-ray should trigger CT/MRI. Smoking/alcohol/steroid exposure raises AVN on the differential; fever/immunosuppression (lupus, inflammatory bowel disease, psoriasis, biologic therapy, etc.) raises septic arthritis. Ask about long-term bisphosphonates because atypical femoral fractures may present with pain and subtle callus before a complete fracture. And remember metal: arthroplasty, dynamic hip screws and intramedullary devices create risk for infection and periprosthetic fracture.
Lateral superficial pain + point tenderness + preserved passive ROM	Greater trochanteric pain syndrome, gluteus medius/minimus tendinopathy, trochanteric bursitis	Pain is reproducible over the greater trochanter and worsens with resisted abduction or single-leg stance; rotation is usually preserved.
Anterior groin pain + pain with resisted flexion or passive extension	Iliopsoas tendinopathy/bursitis, abscess, hematoma	Fever/leukocytosis/immunosuppression suggest abscess. Anticoagulation, anemia, flank/groin ecchymosis or femoral neuropathy suggest hematoma.
Pain below knee or neurologic features	Lumbar radiculopathy or femoral neuropathy from psoas hematoma/abscess	Do not anchor on the hip. Check reflexes, sensation, strength, and back symptoms.
Young adult groin pain + loss of internal rotation	Femoroacetabular impingement	Usually male, age 30s to 40s. Like frozen shoulder loses external rotation, FAI loses internal rotation in the hip.

Pitfall: *Assuming lateral hip pain is bursitis only.* ***Greater trochanteric pain syndrome*** *is analogous to rotator cuff tendinopathy. A tendon that degenerates, tears and that irritates the adjacent bursa. Bursitis may be the smoke; but tendinopathy is the fire.*

PoCUS for atraumatic hip pain in the ED: identifying hip effusions

PoCUS can identify a hip effusion and guide hip aspiration when septic arthritis is suspected and interventional radiology is not available. Measure the joint space of bilateral hips; a difference of 2mm or more is significant. Absence of an anterior effusion early in disease does not completely rule out septic arthritis, and the presence of effusion is non-specific, occurring in fracture, infection (don't forget to consider STI risk factors), inflammatory arthritis or hemarthrosis. PoCUS cannot rule out a hip fracture - sensitivity is poor.



Source:
https://pmc.ncbi.nlm.nih.gov/articles/PMC11628435

Classification of hip fractures in the ED by location and age of patient

Two questions to guide hip fracture management in the ED:

1. Is the fracture **intracapsular** (femoral neck and proximal) or **extracapsular** (distal to femoral neck)?
2. Is the patient **young** or **old**?

Intrascapular fractures: The concern with an intracapsular fracture is compromise of the femoral head bloody supply, increasing the risk of avascular necrosis of the femoral head. In a young patient, an intracapsular fracture is an orthopedic emergency. *Time is femoral head.* Preserving the native femoral head is a priority, and these patients need OR as soon as possible. Conversely, in an older adult with an intracapsular fracture, preserving the native femoral head is less of a priority and these patients are often treated with hip arthroplasty.

Extracapsular fractures include intertrochanteric and subtrochanteric fractures. They bleed outside the capsule and therefore can bleed more substantially. Subtrochanteric fractures behave more like femoral shaft fractures and are particularly important in anticoagulated elderly patients because of blood loss and transfusion risk. Younger patients with extracapsular fractures should be monitored for compartment syndrome.
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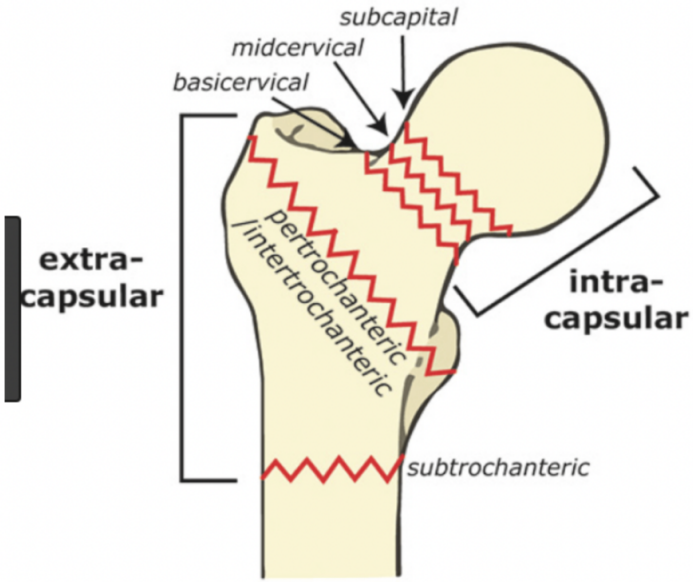

Source: https://paulthorntonbott.com/hip-conditions/hip-fracture/

Calling a hip injury consult: what does orthopedics want to know

- Mechanism: low-energy fragility fall vs high-energy trauma.
- Fracture description: femoral neck, intertrochanteric, subtrochanteric, greater trochanter, acetabular/pelvic involvement, displacement and whether x-ray/CT/MRI is pending.
- Baseline function: ambulatory status, independence, cognition and goals of care where relevant.
- Comorbidities and medications, especially anticoagulants/antiplatelets and exact last dose.
- Bloodwork concerns: hemoglobin, renal function, electrolytes, INR and type & screen.
- Analgesia given, whether a block was done, NPO status and delirium-prevention steps already started.

Diagnosing and managing greater trochanter fractures in the ED

Greater trochanter fractures are usually managed non-operatively, weight bearing as tolerated, but apparent isolated greater trochanter fractures may have occult intertrochanteric extension on MRI. If the fracture extends across the midline or the patient has persistent inability to weight bear, the injury may be unstable and require operative fixation.

There is also an important exception in younger active patients: a large displaced greater trochanter fracture may function like an avulsion of the gluteus medius insertion, analogous to a full-thickness rotator cuff

tear of the shoulder. Even without major intertrochanteric extension, loss of the abductor mechanism can cause major functional impairment and may warrant operative fixation.

Systematic approach to reading hip and pelvis x-rays in the ED

- On the AP pelvis, force yourself to read systematically - outside to inside or inside to outside - from greater trochanter to pubic symphysis, comparing both sides. Don't forget to scrutinize the acetabulum.
- Look at the femoral head/neck, intertrochanteric line, lesser and greater trochanters, acetabular roof and columns, pubic rami and sacrum.
- If there is prosthetic hardware, the x-ray must include the tip of the prosthesis. Periprosthetic fractures often occur at the stress riser at the end of the stem. A standard hip series may not show the tip of a long stem; order femur films if needed.
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Native hip dislocation: reduce early after life threats

Native hip dislocation is usually secondary to high-energy trauma. Posterior dislocation is most common: shortened, internally rotated and adducted. Anterior dislocation is rare and likely externally rotated and shortened.

- Get an x-ray to confirm direction/pattern unless the patient is crashing and/or the diagnosis is clinically obvious.
- Reduce early: native hip dislocation is an orthopedic emergency. Once life threats are addressed, reduction should not wait for a CT just to map every fragment. Prolonged dislocation threatens femoral head perfusion and sciatic nerve function.
- Do not keep pulling through repeated failed attempts. If it will not reduce with good sedation and technique, stop and call for help.
- CT usually comes after reduction for a posterior dislocation. Fragments are common and not usually a reason to delay reduction. CT before reduction is more compelling when the plain film shows bone clearly blocking the reduction

path, the pattern is not understood, or the patient has a complex polytrauma workflow where CT is happening immediately anyway.
- The most common reason for irreducible native hip dislocation is soft-tissue buttonholing through the posterior capsule, requiring open reduction.

Reducing posterior hip dislocations in the ED: tricks and techniques

Our guest experts' preferred technique for reducing hip dislocations is the **Whistler technique**. This is a modification of the **Captain Morgan technique** that requires less brute force and is less dangerous to the clinician than the traditional **Allis technique.**

The Whistler technique is done with the patient lying supine on the stretcher with both knees flexed and feet on the stretcher; assistant stabilizing the pelvis; put your arm under the affected side knee onto the contralateral knee; hold the affected side ankle with your other hand; lift from your knees while adding the appropriate vector; internally rotate the hip.
If a couple of good attempts fail despite adequate sedation and a change in technique, stop and involve orthopedics/anesthesia for reduction in the OR with paralysis.

Pearl: *Internal rotation at the hip while performing the Whistler technique puts the knee in valgus and helps the femoral head clear the acetabular rim.*

Pitfall: *Light sedation for a hip reduction. Hip dislocations involve some of the largest muscles in the body and appropriate sedation, sometimes requiring airway management, is more important than the choice of technique.*

Post-reduction care of hip dislocation patients in the ED

1. Gently assess **stability.** If the hip falls back out with gentle flexion/internal rotation/external rotation, that is critical information, especially in an arthroplasty patient who may need revision.
2. Reassess and document **sciatic nerve function** when the patient is awake.
3. Obtain post-reduction imaging. **Consider CT** after reduction for native hip dislocations to assess for acetabular or intra-articular fragments, femoral head injury, and congruity.

4. **Immobilize** appropriately to prevent re-injury. Preventing knee flexion with a knee immobilizer helps prevent hip flexion into the unstable position, reducing the chance of re-dislocation.

Key take home pearls and pitfalls for hip emergencies in the ED

Pearls:

- **Surgical repair of hip fractures within 24 hours is ideal to restore mobility.** The high morbidity/mortality is driven less by the bone injury itself than by what can follow secondary to immobilization: delirium, pneumonia, venous thromboembolism, pressure injuries, myocardial infarction and deconditioning.
- **The hip fracture can occur before the fall or with no fall.** In older adults, in particular those with osteoporosis, twisting/jerking movements alone are enough to cause a fracture.
- **Symmetric non-painful bilateral active straight leg essentially rules out serious injury from L spine to proximal femur.** The iliopsoas originates from the L-spine and inserts on the lesser trochanter and actively stressing this mechanism tests multiple areas at the same time.
- **The patellar-pubic percussion test is a highly sensitive and specific physical exam maneuver for hip fracture**. In resource limited settings, an abnormal test could support a decision to transfer urgently for more advance imaging.
- **Not all atraumatic hip pain is arthritis.** Broaden your differential for atraumatic hip pain to include AVN, iliopsoas abscess/ hematoma, septic hip, atypical femur fractures, subchondral insufficiency fractures, and greater trochanteric pain syndrome.
- **Young patient + femoral neck fracture = orthopedic emergency.** A femoral neck fracture portends risk of bleeding within the joint capsule, putting the femoral head at risk. While older adults with femoral neck fractures typically require a hip arthroplasty, the goal in young patients is to preserve the native hip and this requires getting to the OR as soon as possible.
- **Be prepared for blood loss in patients with intertrochanteric and more distal fractures.** Especially be cautious in older patients on

anticoagulation or DAPT. Younger patients are at risk for compartment syndrome with these fractures; consider avoiding hip blocks that could mask pain in these patients.

- **The Whistler technique for reducing posterior hip dislocations is safer for the clinician and requires less force than other methods.** However, what matters more than technique choice is a patient who is appropriately sedated which may require a general anaesthetic.

Pitfalls:

- **Missing the basics in the ED can delay OR.** Clarify last dose of anticoagulation and reverse if necessary, order NPO, prevent delirium by minimizing opioids , perform a hip block early, pre-op labs and ECG.
- **Ruling out a hip fracture based on a normal x-ray and CT.** If clinical suspicion for fracture is high and x-ray is normal, advanced imaging should be pursued as 2-10% of hip fractures are radiographically occult. Even CT isn't perfect, and MRI is sometimes needed to pick up non-displaced femoral neck fractures, intertrochanteric extension of greater trochanter fractures, early marrow edema, and subchondral insufficiency fractures (i.e. stress fracture of the older adult hip).
- **Missing a pelvic fracture because we aren't looking for it.** Features on exam suggestive of a pelvic fracture: medial groin pain, public symphysis pain, pain with compression of the pelvis. Adopt a systematic approach to reading hip and pelvis x-rays that includes careful interrogation of the acetabulum/ pubic rami.
- **Ruling out a periprosthetic fracture with incompletely imaged hardware.** Often need to order femur series along with hip images in patients with prosthetic joints to see the distal tip of the prosthesis as this is a common location for periprosthetic fracture.
- **Forgetting to test internal rotation at the hip in patients with atraumatic hip pain.** Femoroacetabular impingement presents with hip pain and loss of passive internal rotation usually in males in their 30s and 40s. It is analogous to frozen shoulder.
- **Not examining the hip in a patient presenting with knee pain.** If pain is not

reproducible on exam of the knee, look more proximally.

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