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Applicability	Erlanger Health - Baroness

Hip Fractures in Geriatric Patients

Guideline Statement :

To provide a systematic approach to the care of patients over 65 years of age presenting with fractures of the hip (femoral neck, intertrochanteric, subtrochanteric)

Scope:

Emergency Medicine Attendings/Residents, Orthopedic Attendings/Residents, Trauma Attendings/Residents, Hospitalists, Internal Medicine/Family Medicine Attendings/Residents, Anesthesia

Introduction:

In the United States, approximately 300,000 geriatric hip fractures occur, with an estimated increase to over 800,000 annually by 2040. 80% of women and 50% of men with hip fractures are over 70 years of age. Even with optimal care, one year mortality is as high as 20-30%. Operative delay of >48hrs from admission is associated with twice the mortality rate at one year. Appropriate and efficient hip fracture surgery (HFS) can reduce the odds of this adverse outcome and facilitate early return to mobility.

Initial Evaluation:

A. History
B. Exam
    1. Inspection
        a. Foot routinely shortened/externally rotated
        b. Skin lacerations/ecchymosis/abrasions
    2. Vascular
        a. Pulses and capillary refill assessment
    3. Neurologic
        a. Motor exam foot/ankle

b. Sensory exam hip to toes

C. Imaging
    1. AP pelvis view (feet ideally internally rotated)
    2. AP and cross-table lateral views of injured hip
    3. Internally rotated *manual traction AP views (by orthopaedic resident)*
    4. AP and lateral views of entire ipsilateral femur

D. Traction
    1. Should NOT be routinely used for the majority of low energy geriatric hip fractures
    2. Exception for severe shortening of fracture

Preoperative Workup

A. Admission: Hospitalist/Geriatrician or Internal/Family Medicine admission for medical evaluation and risk stratification

B. Timing: Hip fracture surgery should be performed urgently, ideally within 24-48 hours, as delays are associated with increased mortality risk and complications such as pneumonia, respiratory failure, VTE, UTIs, pressure ulcers, and increased pain. Delaying surgery for risk stratification testing must be balanced against the competing risks described above.

C. Preoperative Testing
    1. Cardiac Evaluation: Per AHA/ACC guidelines, appropriate cardiac workup with consideration of TTE for patients presenting with:
        a. Acute Coronary Syndrome
        b. Decompensated Heart Failure
        c. Unstable Arrhythmia
        d. History of mod/severe Aortic/Mitral stenosis without TTE in prior 1 year
    2. A TTE may not be necessary if the patient has a recent study or a repeat echo is unlikely to change management (i.e. known HF with new decompensation with plan for diuresis)
    3. Preoperative TTE should also be considered for patients whose fall was preceded by symptoms suggestive of a cardiac etiology, such as syncope, dizziness, or palpitations, to assess for underlying structural heart disease.
    4. **If TTE is in indicated by AHA/ACC guidelines, study should be ORDERED ON ARRIVAL IN ED to expedite the perioperative process**
    5. For questions about further workup necessary to proceed with anesthesia, call 423-778-5580 to discuss concerns with on-call anesthesiologist and they will pass along information to operating room provider
    6. Studies have shown obtaining an echocardiogram or cardiology consultation can delay surgery without affecting management, mortality or complications; many patients who receive an echo do not meet the AHA/ACC criteria.

D. Cardiac Consultation
    1. Cardiology should be consulted to assist with preoperative clearance when patients meet AHA/ACC guidelines. Patients not meeting these criteria should NOT have cardiac

consultation

Condition	Example
Severe valvular disease	Symptomatic mitral stenosis (progressive dyspnea on exertion, exertional presyncope, or heart failure)
	Severe aortic stenosis (mean pressure gradient 0.40 mm Hg, aortic valve area, 1.0 cm^2, or symptomatic)
Significant arrhythmias	Supraventricular tachycardia with uncontrolled ventricular rate (>100 bpm at rest)
	Newly recognized symptomatic ventricular tachycardia arrhythmia
	High degree atrioventricular block (Mobitz II and third degree heart block)
	Symptomatic sinus bradycardia and/or sick sinus syndrome
	Symptomatic bradycardia
Heart failure	Decompensated heart failure NYHA functional class IV
	Worsening or new-onset heart failure
Unstable coronary syndromes	Acute coronary syndrome and/or myocardial infarct
	Unstable angina
	Recent myocardial infarction (<1 mo)

E. Medication Continuation

1. Aspirin for secondary cardiovascular disease prevention should not be interrupted. Consider holding aspirin if prescribed for primary prevention.
2. DAPT therapy after coronary artery stenting must not be interrupted within 1 month after bare metal stent and within 3-6 months after drug-eluting stent
3. Continuation of home rate control medications and home-inhaled bronchodilators/ steroids. Hold home ACE Inhibitors and ARBs to avoid hypotension.

F. Preoperative Medical Optimization

1. NPO for Operating Room
2. Aggressive Hydration: 100 cc/hr maintenance IVF started early (unless contraindicated by underlying preexisting condition)
3. Continue home rate control medications and home inhaled bronchodilators/steroids
4. Hold home ACE Inhibitors and ARBs to avoid intraoperative hemodynamic lability
5. Transfuse as needed for a starting Hgb of 8.0 of 24 prior to surgery
6. All patients require a type and screen prior to arrival in preop holding with blood to be crossmatched based on patient
7. Glycemic control

G. Risk Stratification
    1. Use of HFS note template or smart phrase to include peri-op risk assessment is highly encouraged and is available in the appendix.

Geriatric Hip Fracture Order Set

A. CBC
B. CMP
C. PT/INR, PTT
D. Type and Screen
E. Chest Xray if indicated by history or new symptoms
F. EKG if indicated by history or symptoms

Anesthetic Considerations

A. Either general or spinal anesthesia is appropriate for the surgical management of geriatric hip fractures. When not contraindicated, spinal anesthesia is preferable in geriatric hip fracture patients, particularly if patient has pre-existing dementia
B. Venous access as indicated by patient history and current condition.
C. Placing an arterial line in geriatric patients undergoing surgery for a hip fracture is guided by the need for close hemodynamic monitoring due to their increased risk of perioperative complications. Current guidelines do not specify arterial line placement as mandatory for all hip fracture surgeries but recommend it based on individual patient risk factors.
    1. Severe left ventricular dysfunction (Ejection Fraction < 30-35%)
    2. Severe right ventricular dysfunction
    3. Hemodynamic instability prior to the operating room
    4. Symptomatic valvular pathology
D. If general anesthesia, delirium precautions (consider TIVA, multimodal pain control, avoid long-acting opioids, goal-directed fluid therapy, normotension, electrolyte correction).
E. Transfuse as indicated for a Hgb of 8.0.

Blood Loss mitigation

A. To minimize intraoperative blood loss, tranexamic acid (15mg/kg) should be administered

intraoperatively except when clear contraindications exist

1. Absolute contraindications
    a. Allergy to TXA
    b. Concurrent subarachnoid hemorrhage
2. Relative contraindications
    a. History of VTE/PE, ischemic TIA, acute MI, known seizure disorder

B. Blood transfusion threshold of hemoglobin no higher than 8g/dl is suggested in asymptomatic postop hip fracture patients

Fracture Specific Considerations

A. Femoral neck fractures:
    1. Fracture type
        a. Stable femoral neck fractures (Garden I/II): ideal intervention can include nonoperative care, percutaneous stabilization, or arthroplasty
        b. Unstable displaced (Garden 3/4) femoral neck fractures: arthroplasty is superior to ORIF
    2. Device
        a. For low-functional demand patients without prodromal hip pain or radiographic evidence of hip arthritis, unipolar or bipolar hemiarthroplasty are equally beneficial
        b. For physiologically active patients, total hip arthroplasty is superior to hemiarthroplasty

B. Intertrochanteric hip fractures:
    1. Fracture type
        a. Stable: either sliding hip screw or cephalomedullary devices are indicated
        b. Unstable: cephalomedullary device is indicated as the optimal implant
        c. Subtrochanteric/reverse obliquity: cephalomedullary device is indicated as the optimal implant

Postoperative care

A. Medications
    1. Pain Control
        a. Avoid delirium-inducing medications (narcotics, benzodiazapines, etc.)
        b. Non-opioid pain medications should be the first line for management of postoperative pain, escalating to opioids only when other options are exhausted. Scheduled acetaminophen after HFS has been associated with decreased LOS and decreased pain levels/opioid use.
    2. DVT prophylaxis
        a. Chemoprophylaxis should be administered upon admission and should not be held pre-op unless directed otherwise by orthopedics

b. 30 days of LMWH (enoxoparin) is the preferred agent for HFS
    i. Aspirin is an acceptable alternative
c. For patients with CrCl <30, consider UFH 5000u BID (outpatient dosing regimen only) or aspirin 81mg BID
d. Alternatively, resume chronic baseline DOAC therapy on post-op day 1 for low risk bleeding patients and post-op day 2 or 3 for high risk

3. Bone Health
    a. Low level trauma fractures of the hip meet diagnostic criteria for osteoporosis. Osteoporosis diagnosis should be included in the discharge summary as a new or existing problem.
    b. Vitamin D 25 OH levels should be collected upon admission
    c. Recommended vitamin D doses per 25[OH]D levels (12):
        i. <15: 50,000IU weekly x 8 weeks
        ii. 15-30: 2000IU daily
        iii. 31-40: 1000IU daily
        iv. >40: no supplement
    d. Patients should be counseled to discuss further osteoporosis treatment with their PCP

B. Ambulation
    1. Goal is to permit weight bearing as tolerated without postoperative hip precautions (50% of patients will present with preoperative dementia or have postoperative delirium)

C. Therapy
    1. Day of surgery therapy if out of PACU by 14:00
    2. Twice daily therapy thereafter until discharge

D. Delirium Precautions
    1. Delirium is a syndrome characterized by a fluctuating state of altered awareness, consciousness, cognition, and attention. Often, patients can be grouped into hyperactive or hypoactive states of delirium
    2. Identify underlying causes
        a. D - Drugs/medications/polypharmacy
        b. E - Electrolytes (Na, Ca, CO2), Environment change
        c. L - Lack of drugs (withdrawal), Lack of sleep
        d. I - Infection, Immobility, Iatrogenic
        e. R - Restraints, Reduced sensory input (glasses, hearing aids)
        f. I - Intracranial (stroke, hemorrhage, seizure, meningitis)
        g. U - Urinary retention, constipation, Uncontrolled pain
        h. M - Metabolic (hypoxia, uremia, hepatic encephalopathy, thyroid)

3. Stop precipitating medications
    a. Review substance use history
    b. Review pharmacy medication reconciliation
    c. Review MAR for medications administered during admission
    d. Common medications
        i. Anticholinergics
        ii. Corticosteroids
        iii. Opiates
        iv. Sedative hypnotics: Benzos, zolpidem
        v. Polypharmacy
        vi. Other: Dopamine agonists, muscle relaxants, gabapentin
4. Treatment
    a. First utilize non-pharmacologic options: Family visitation, frequent reorientation, cognitive/sensory stimulation (TV on during day, utilize chaplain, hearing aids/glasses). Optimize sleep/wake disturbances (TV/lights off at night), stop unnecessary phlebotomy/labs, blinds open during day.
    b. Eval for urinary retention or constipation. Remove unnecessary accessories: telemetry, continuous pulse ox, foley, etc.
    c. Treat underlying causes/stop offending meds as above
5. If posing a threat to self or others, consider using antipsychotics. Recommend evaluating QTc.
    a. The FDA has black-box warnings on antipsychotics regarding increased risk of mortality when used in patients with dementia.
    b. Second-generation (compared to first) antipsychotics generally have a lower risk of extrapyramidal symptoms and tardive dyskinesia
    c. Avoid antipsychotics in hypoactive delirium and try to avoid prescribing anti-psychotics upon hospital discharge

Appendix:

A. **Periop Risk Assessment Statement:**

1. Pt reports *** history of MI, ***CP, orthopnea, or evidence of volume overload. EKG obtained/reviewed ***, *** evidence of ischemia. Baseline functional status *** METs. RCRI*** indicating *** 30 day risk of death, mi, or arrest. *** further medical optimization or risk stratification testing is indicated before proceeding with urgent surgery. (versus 'The benefits of further medical optimization or risk stratification testing do not outweigh the established risks of delaying an urgent surgery'
2. HFS is a major orthopedic surgery that is considered moderate cardiac risk per ACC/AHA and high bleeding risk per CHEST.
3. Metabolic equivalents (METs) describe baseline functional capacity and poor METs have been associated with increased cardiac complications.

4. The Revised Cardiac Risk Index for Pre-Operative Risk (RCRI) is a validated risk assessment model used to estimate risk of cardiac complications after non-cardiac surgery. Alternative models such as NQSIP can be used.

Excellent (>7 METs)	Moderate (4 to 7 METs)	Poor (<4 METs)
Squash Jogging (10-minute mile) Scrubbing floors Singles tennis	Cycling Climbing a flight of stairs Golf (without cart) Walking 4 mph Yardwork (e.g., raking leaves, weeding, pushing a power mower)	Vacuuming Activities of daily living (e.g., eating, dressing, bathing) Walking 2 mph Writing

Risk factor	Description	Points
Elevated-risk surgery*	Intraperitoneal; intrathoracic; suprainguinal vascular	+1
History of ischemic heart disease	History of myocardial infarction (MI); history of positive exercise test; current chest pain considered due to myocardial ischemia; use of nitrate therapy or ECG with pathological Q waves	+1
History of congestive heart failure	Pulmonary edema, bilateral rales or S3 gallop; paroxysmal nocturnal dyspnea; chest x-ray (CXR) showing pulmonary vascular redistribution	+1
History of cerebrovascular disease	Prior transient ischemic attack (TIA) or stroke	+1
Pre-operative treatment with insulin	--	+1
Pre-operative creatinine >2 mg/dL / 176.8 µmol/L	--	+1

RCRI Score	Risk of major cardiac event (95% CI)*
0	3.9% (2.8-5.4%)
1	6.0% (4.9-7.4%)
2	10.1% (8.1-12.6%)
≥3	15% (11.1-20.0%)

B. Antithrombotic Management:
    1. VTE prophylaxis
        a. Aspirin: Hip Fracture Surgery patients have specifically been excluded from clinical trials for testing aspirin against other agents to prevent VTE. The two largest clinical trials to date, EPCAT II and CRISTAL tested aspirin against enoxaparin or rivaroxaban after elective hip or knee arthroplasty.
            i. EPCAT II was a non-inferiority DBRCT that compared rivaroxaban vs aspirin after elective hip arthroplasty (n=3424). Both treatment arms received 5 days of rivaroxaban post-op prior to switching to aspirin 81 daily vs rivaroxaban 10mg daily. There was no difference in rates of VTE or bleeding.
            ii. CRISTAL was a cluster-randomized non-inferiority trial that compared aspirin 100mg daily vs enoxaparin for 35d after elective hip arthroplasty. Aspirin failed to reach the non-inferiority endpoint with symptomatic VTE rates of 3.45% vs 1.8% with enoxaparin (most were below-the-knee symptomatic DVT).
            iii. The CHEST, ASH, and NICE guidelines preferred LMWH over aspirin for VTE prevention for HFS while the AAOS did not prefer any pharmacologic agent.

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Approval Signatures

Step Description	Approver	Date
COO	John Winks: Executive Vice President-COO	02/2025
Trauma Services Committee Approval	Stephanie Spain: Trauma Prgm Mgr Adult	02/2025
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Applicability

Erlanger Health - Baroness