



June 2018

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A Resource for Interprofessional Providers

Hip Fractures: Update on Perioperative Management

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Hip fractures resulting from ground level falls occur commonly in the geriatric population. The Centers for Disease Control and Prevention (CDC) reports that yearly, over 300,000 people over age 65 are hospitalized for a hip fracture, invariably requiring surgery. Depression and a decline in functional mobility are seen in over 20% of older adults who sustain a hip fracture, and between 18-33% will die within one year.

The frequency of perioperative complications and their associated morbidity and mortality have prompted The American Geriatric Society (AGS) and the College of Surgeons (ACS) to develop a "Surgical Quality Improvement Program (NSQIP)" with the goal of optimizing in-hospital management and outcomes beneficial to older adults. (<https://www.facs.org/quality-programs/geriatric-coalition/resources>). Coupled with interdisciplinary care of the complex geriatric patient, these guidelines are intended to reduce the functional decline that so commonly occurs following a hip fracture and improve outcomes overall.

Pre-Operative Management

Hip fracture repair is considered an urgent, elevated-risk procedure. A key consideration is ensuring early surgical repair (ideally within 24-48 hours after fracture). In the pre-operative phase, emphasis is placed on assessing medical co-morbidities, preventing venous thromboembolism (VTE), medication review, assessing fluid status, and clarification of advanced directives.

Assessing Medical Co-Morbidities involves evaluating cardiac, pulmonary, and renal conditions that may influence anesthetic and surgical choices. Physiologic changes in these organ systems due to aging and stress of surgery often result in adverse events such as hypotension, ischemia, aspiration or pneumonia, hypoxemia, and fluid overload. The risk for perioperative cardiac events is increased in patients with elevated or hypotensive systolic blood pressures (>180 mm Hg or <90 mm Hg) or an elevated diastolic pressure (>110 mm Hg). Elevated troponin levels,

decompensated heart failure, significant arrhythmia, and critical aortic stenosis all warrant cardiology consultation. In the absence of these conditions, however, additional testing is unlikely to change management prior to surgery.

VTE Prophylaxis is a crucial aspect of managing hip fractures. Hip fractures are in the highest risk category for VTE, including pulmonary embolism, beginning at the time of the fracture and extending beyond 30 days postoperatively. Recommendations for anticoagulation have historically been published by the American College of Chest Physicians. In 2015, the American Academy of Orthopedic Surgeons issued guidelines which, for the first time, included aspirin for VTE prevention in certain cases (e.g., renal impairment with creatinine clearance <30ml/min, which increases risk of bleeding with enoxaparin). Studies are ongoing to provide clarification of the dose, frequency, and length of treatment with aspirin.

Medication Review involves careful assessment of a patient's home medications that can negatively affect perioperative outcomes. Unnecessary medications should be discontinued to minimize interactions with medications that may be given in the perioperative period. Common medications requiring discontinuance or dose reduction include diuretics, non-steroidal anti-inflammatory drugs, and medications with highly anticholinergic properties. Glomerular filtration rate should be calculated using the Cockcroft-Gault formula to accurately adjust medications for renal impairment in older adults (<https://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation>).

Fluid Status affects renal function. Dehydration is frequently present due to blood loss from the fracture, lack of fluid intake, or diuretic medications, and dehydration can increase the risk of postoperative delirium as well as cause hypotension leading to renal injury. In older adults, fluid replacement requires a balance between restoring hydration and avoiding fluid overload.

TIPS FOR DEALING WITH PATIENTS WHO HAVE A HIP FRACTURE

- Seek to have surgery performed within 48 hours, and ideally within 24 hours.
- Evaluate medical conditions and hydration before surgery.
- Assess for and prevent delirium throughout the patient's treatment.
- Get the patient up and out of bed on the first post-operative day. Early mobilization aids in recovery.
- Treat osteoporosis with calcium, vitamin D, and (unless contraindicated) bisphosphonates.
- Continue rehabilitation for at least 4-6 weeks after discharge.

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Advance Directives should be clarified. Communication with the patient and family helps to establish a clear picture of the patient's treatment goals and preferences, and wishes, should an adverse event occur.

Post-Operative Management

Post-operative management of geriatric patients with a hip fracture stresses early mobility, prevention and treatment of delirium and pain, elimination of tethers, avoidance of pulmonary complications, and monitoring for acute blood loss. Mobilization on the first post-operative day has been shown to decrease the incidence of delirium, VTE and pneumonia. Eliminating tethers (urinary catheters, IVs, drains and monitors) helps to encourage mobility.

A "Rounding Checklist" has been developed by the ACS NSQIP/AGS, providing approaches to detecting and preventing post-operative complications (Table 1). A link to the checklist is below in the References and Resources list.

Post-Discharge Care

Osteoporosis. Low-impact fractures are, by definition, due to osteoporosis. Following a hip fracture, the risk for a second fracture is 6-10 times more likely. Men are frequently overlooked for treatment but have higher 1-year mortality rates following a hip fracture. Most patients benefit from treatment with bisphosphonates, denosumab, or a promoter of bone formation (teriparatide or abaloparatide). These drugs should be started 2-12 weeks after surgery. Calcium (1200mg daily) and vitamin D3

Table 1. Complications Following Hip Fracture

| Complication | Implication |
|---------------------------------|---|
| Delirium | Develops in up to 60%. Impedes recovery. Increases risk for other complications. |
| Blood Loss | May precipitate cardiovascular events. Should be closely monitored. Transfuse if Hgb<8. |
| Pain | May cause delirium if undertreated |
| Pneumonia | Most common complication |
| Constipation | Frequent in the elderly on narcotic medications; can cause pain, delirium |
| Malnutrition Pressure Ulcers | Predisposes to infection and slows recovery. Associated with poor nutrition. Prevented by early mobilization. |

(1000-4000 IU daily) should be started while in the hospital. A post-discharge clinic appointment should be made to address the treatment of osteoporosis.

Rehabilitation. Physical and occupational therapy should begin in the hospital with an evaluation of the patient's strengths and functional limitations so as to recommend the appropriate post-discharge setting that will support safety, improve independent function, and prevent future falls. Therapy for 4-6 weeks after discharge is typical.

Table 2. Priorities in the Geriatric Management of Hip Fracture

| PRE-OPERATIVE | POST-OPERATIVE | POST-DISCHARGE |
|---|---|---|
| Assess and stabilize comorbidities | Early mobility | Treat osteoporosis |
| Rehydrate; eliminate non-essential meds | Prevent delirium and manage pain | Continue rehabilitation after discharge |
| Address advance directives | Remove all tethers/restraints/catheters | Exercise and fall prevention |
| VTE prophylaxis | | |

References and Resources

- 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. <http://circ.ahajournals.org/content/130/24/e278.short>
- American College of Chest Physicians: Evidence-based Clinical Practice Guidelines on Antithrombotic and Thrombolytic Therapy. http://chestjournal.chestpubs.org/content/133/6_suppl/71S.full
- Coalition for Quality Geriatric Surgery Project. ACS NSQIP/AGS Perioperative and Postoperative Guidelines. (Includes Rounding Checklist) <https://www.facs.org/quality-programs/geriatric-coalition/resources>
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Supported by: Donald W. Reynolds Foundation, Arizona Geriatrics Workforce Enhancement Program and the University of Arizona Center on Aging

This project was supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant number U1QHP28721, Arizona Geriatrics Workforce Enhancement Program. This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS or the U.S. Government.