Medical Care of the Hip Fracture Patient

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At the conclusion of this activity, participants should be able to:
1. Organize the many medical concerns facing frail patients with hip fracture into three main questions.
2. Recognize the value of preoperative cardiac testing in this population.
3. Address modifiable pre- and postoperative risk factors for adverse postoperative events.
4. Identify the level of evidence supporting medical decisions addressed in caring for patients with hip fracture.

INTRODUCTION
In 2000, there were 150,000 hip fractures in the United States. Since advanced age is a significant risk factor for hip fracture, the aging demographics of the U.S. population would indicate that the number of persons sustaining hip fractures is expected to grow significantly in the coming decades.1

Hip fractures deserve very careful consideration because of their dramatic effects on the functioning and well-being of elderly patients. The excess risk of death attributable to a hip fracture versus age-matched controls is approximately 11%, but even more dramatic are the decrements in func-

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tion that commonly accompany this disease. Acute mortality is approximately 5%. Despite improvements in perioperative medical management, anesthetic techniques, and surgical approaches that have made the repair of hip fracture safer, functional recovery remains quite poor. Unfortunately, less than half of those who were independent before fracture are able to walk independently 1 year after fracture, and a full 20% become completely nonambulatory. Only about one-third, or up to 40%, recover their full activities of daily living to their premorbid state. A significant proportion of patients need to change residency, and about one-quarter will then be placed in a nursing home for long-term care. Magaziner and colleagues evaluated the time course of recovery in eight different domains and demonstrated that recovery time was specific to each domain. For example, depressive symptomatology and upper-extremity function largely recover in the first 4 months after fracture, while lower-extremity function takes closer to 1 year for full recovery to occur. These decrements in function certainly have an impact on quality of life for the individual, as well as a significant impact on the health care system. It is estimated that care of patients with hip fracture will cost the health care system more than $130 billion annually by 2050.

Prevention of falls by identification and treatment of falls risk factors, and prevention of fracture by reducing falls and addressing osteoporosis are certainly the most important strategies to reduce the morbidity associated with hip fractures. However, when this fails and the patient does suffer a hip fracture, other approaches are needed.

This article focuses on the acute management of the patient with a hip fracture. Readers are referred to other sources for more detailed discussions about longer-term rehabilitation and recovery after hip fracture, as well as secondary prevention.

THREE IMPORTANT QUESTIONS TO ADDRESS IN THE MEDICAL CARE OF THE HIP FRACTURE PATIENT

1. Should this patient have surgery?

The current standard of practice for treatment of hip fracture focuses on surgical management; however, it is well known that recovery after hip fracture is disappointing for many patients, and clearly not all patients are significantly benefited by this approach. The surgical approach that is selected depends on many factors, including the surgeon’s personal preference, ambulatory status of the patient, co-occurrence of underlying bone diseases, anticipated life expectancy, and location and degree of displacement of the fracture itself (Figure). For example, nearly half of hip fractures occur in the femoral neck while the other half largely occur in the region between the greater and lesser trochanter (intertrochanter, also known as subcapsular, fractures). Most femoral neck (also known as intracapsular) fractures with any degree of displacement will be treated with hemiarthroplasty using a bipolar or unipolar device because of the high likelihood of disruption of the blood supply to the femoral head with displaced fractures in this region, and the attendant risk of nonunion and osteonecrosis (Table I). In contrast, fractures in the intertrochanter area are usually treated with open reduction and internal fixation with various screws, nails, and rods, even when these fractures are quite displaced, because this region of the femur has redundant blood supply, and fractures in this zone do not tend to disrupt the blood supply to the femoral head. The best approach for treatment of nondisplaced femoral neck fractures is very controversial and dependent on more of the other factors listed above. All surgical approaches other than percutaneous pinning will require anesthesia, either by endotracheal tube administration or spinal anesthesia.
Often overlooked in caring for a patient with hip fracture is a nonoperative management plan, which consists of immobilization with careful attention to pain control, skin care, deep vein thrombosis (DVT) prophylaxis, and prevention of pulmonary complications from immobility (Table II). Unfortunately, there are very little data comparing nonoperative approaches with surgical approaches to help guide treatment decisions. Though frequently touted as a more effective route to pain relief, there is no evidence to support that surgery improves pain. Likewise, there are no data on quality of life and caregiver burden after each approach, though these outcomes are certainly relevant to this population. A systematic review published in 2000 found some evidence that certain complications, anatomic alignment, and probably function are all improved with surgical versus nonoperative therapy.11 However, this review noted that the data were too weak to draw firm conclusions. Thus, most authorities feel that the primary reason to consider a surgical approach over a nonoperative approach is when gain in function is the primary aim. Nonoperative approaches may be appropriate for people with very limited life expectancies, those with severe comorbid conditions that make surgery prohibitive, or those who are bedridden or nearly bedridden before the fracture.

2. What can I do to make surgery safer for this patient?

Traditionally, preoperative evaluation has largely focused on testing to determine the risk of adverse cardiac events after surgery. While cardiac risk stratification may in certain circumstances provide useful information, mounting evidence demonstrates that cardiac evaluation beyond history, physical examination, and electrocardiogram in most instances does not favorably alter outcome. The paradigm now is moving away from preoperative testing to preoperative risk reduction. Indeed, evidence demonstrates that perioperative cardiac risks are increased when surgery is performed within 6 weeks after angioplasty with stent placement;12 thus, this approach should never be used simply to “get a patient through surgery.” In a prospective, randomized clinical trial of prophylactic revascularization in patients with two or more major coronary vessel occlusions prior to peripheral arterial surgery (lower-extremity bypass or abdominal aortic aneurysm repair), neither coronary artery bypass graft (CABG) nor angioplasty reduced postoperative cardiac events or death.13 Therefore, surgery is not an indication for preoperative stress testing and subsequent revascularization; such testing should only be done in the preoperative period if the patient has indications for the testing, apart from the fact that he or she will soon be getting surgery.

Perioperative beta blockers have been shown in prospective randomized studies to reduce the rates of postoperative adverse cardiac events, both in the short and long term, in patients with
out their surgery had dramatically reduced rates of postoperative myocardial infarction, cerebrovascular accidents, renal failure, and gut infarct, without an increased rate of requiring transfusions, clinical bleeding episodes, or impairing wound healing. \(^{16}\) This finding needs to be confirmed in prospective randomized studies involving a variety of patients undergoing both cardiac and non-cardiac surgeries before widespread endorsements of this approach; however, this evidence does suggest that in patients who are taking aspirin, it probably is not important to discontinue their aspirin in the perioperative phase, and perhaps may be better to continue it.

Similarly, in a retrospective case-control study of just under 3000 patients undergoing vascular surgery, the group who took statin medications perioperatively had significantly lower rates of death compared to the group that was not treated with statin medications. \(^{17}\) These preliminary investigations serve as justification for randomized trials of these agents targeting perioperative cardiac outcomes.

About 13% of surgeries overall are associated with postoperative pulmonary complications. Postoperative pneumonia has an approximate 20% in-hospital

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**Types of Surgical Repair for Hip Fracture**

<table>
<thead>
<tr>
<th>Type of Fracture</th>
<th>Possible Devices</th>
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<tbody>
<tr>
<td>Femoral neck—nondisplaced or impacted</td>
<td>Cannulated screws, pins, nails</td>
</tr>
<tr>
<td></td>
<td>Compression screws with side plate</td>
</tr>
<tr>
<td></td>
<td>Hemiarthroplasty—unipolar or bipolar</td>
</tr>
<tr>
<td>Femoral neck—displaced</td>
<td>Hemiarthroplasty—unipolar or bipolar</td>
</tr>
<tr>
<td>Intertrochanter</td>
<td>Compression screws with side plate</td>
</tr>
<tr>
<td></td>
<td>Intramedullary nails</td>
</tr>
<tr>
<td>Subtrochanter</td>
<td>Same as for intertrochanter fractures</td>
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</tbody>
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**Treatment Options for Hip Fracture**

**Conservative Management**
- Bedrest
- Traction*  
- Pain control
- Skin care
- DVT prophylaxis
- Personal care may require nursing home

**Surgical Management**
- Arthroplasty or fixation with pin, screws, rods, nails
- Anesthesia
- Pain control
- Skin care
- DVT prophylaxis
- Subacute stay
- Home physical therapy

* The role of traction is unclear.

\( DVT = \text{deep vein thrombosis.} \)
mortality rate; thus, this complication is common and particularly ominous for an elderly patient with hip fracture. Preoperative factors can identify patients at particular risk for postoperative pneumonia. These risk factors include a history of smoking, underlying lung disease, advanced age, poor functional status, and, to some degree, the type of anesthetic approach used—with general anesthesia associated with a higher risk of postoperative pulmonary complications than spinal or regional anesthesia, particularly in patients with underlying lung disease.18 Particularly for patients with underlying lung disease, the anesthesiologist may consider choosing another form of anesthesia over general anesthesia, if feasible. There are very few studies aimed at reducing postoperative pulmonary complications, but most authorities recommend smoking cessation at least 6 weeks before an elective surgical procedure (unlike hip fracture repair), aggressive pulmonary toilet, use of deep breathing with or without incentive spirometry device, and early mobilization as soon as feasible after surgery.18 Currently, there is controversy about whether surgery should be delayed, and, if so, for how long, when there is evidence of a pulmonary infection.

There is clear evidence of benefit from therapies aimed at reducing the incidence of DVT as a postoperative complication. Most common regimens include administration of low-molecular-weight heparin started on the day after therapy, or warfarin started on the evening before surgery, with or without mechanical compression devices. Again, early mobilization is central in preventing deep thrombophlebitic complications. Mechanical devices, such as pneumatic compression devices or graded compression hose, are also effective, but have not been compared to pharmacologic prophylaxis nor studied combined with medications. Most regimens suggest 10-14 days of pharmacotherapy, though some benefit has been demonstrated with longer durations of treatment; thus, duration of prophylaxis remains controversial.

Delirium is an especially common complication after hip fracture surgery, occurring in 30-60% of patients. It is clear that prevention is more effective than treatment of delirium. Risk factors for delirium include premorbid dementia, advanced age, use of psychoactive medications, inadequately treated pain, infection at admission, male gender, and polypharmacy. Identification of remediable potential precipitants of delirium is of primary importance in the preoperative phase. This would include evaluating for sensory impairment and treating this if identified, careful review and adjustment of medications, searching for infections and treating as appropriate, assuring appropriate volume status, adequately treating pain, and repletion of electrolytes. Studies of multifactorial interventions aimed at improving sensory input, minimizing medications, minimizing sleep disruption, and utilizing other environmental manipulations to maintain orientation have demonstrated reduction in the incidence of delirium in acutely ill medical inpatients. These approaches seem reasonable to implement in the hip fracture population as well. Further, studies involving hospitalists, internists, or geriatricians in combined service teams with orthopedic surgeons have also shown reductions in the development and severity of delirium in hip fracture patients.

Finally, good data demonstrate that perioperative use of antibiotics prophylactically for hip fracture repair reduces the risk of postoperative infections, specifically wound infections. Cephalosporins are the antibiotics that have been most extensively studied.

3. What are the important postoperative issues to address?

As mentioned, deep breathing with or without incentive spirometry device, pharmacotherapy to pre-
vent DVT, perioperative beta blockers, and interventions to reduce the risks of delirium should be continued at least into the early phases of recovery from fracture surgery. Nearly all hospital-acquired urinary tract infections are secondary to use of a Foley catheter beyond 72 hours. Thus, a Foley catheter should be discontinued on postoperative day 1. Importantly, mobilization on postoperative day 1 has also been shown to be very safe and effective in preventing deconditioning and facilitating functional recovery in patients with hip fracture. Because postoperative delirium is common in this population, frequently undetected, and may be the sole presentation of serious underlying pathology such as a postoperative myocardial infarction (peak incidence on postoperative day 3), delirium should be regularly screened for by using a confusion assessment method or other standardized screening test. Although not yet well studied, it is believed that many of the decubitus ulcers detected in rehabilitation facilities in this patient population have their genesis in the acute care setting. Consideration of the patient’s risk to develop pressure ulcers can help guide determination of effective therapies, such as frequent turning and repositioning, mobilization, and use of air mattresses and other pressure-relieving devices.

The majority of patients are stable enough for transfer to an inpatient rehabilitation facility by postoperative day 2 or 3 if they have no complications. There are very little data on whether nutritional supplementation is effective and appropriate for patients after hip fracture. Finally, evaluating for the risks of recurrent falls and fractures is an important part of fracture aftercare. Consideration should be given to whether the patient requires further evaluation for osteoporosis, whether he or she would benefit from osteoporosis treatment, and when to initiate this treatment. Likewise, a thorough falls assessment should be undertaken, either during the acute hospital stay or during recovery in a rehabilitation facility, ideally before the patient is discharged to his or her previous living environment.

CONCLUSION

Patients with hip fracture are frequently frail, with complex medical and surgical needs. These patients likely benefit most from a meticulous approach to their preoperative and perioperative care, as well as involvement of multidisciplinary teams of care providers.

REFERENCES