

Initial Preoperative Management of Geriatric Hip Fractures

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Abstract

Hip fractures are a common emergency among the geriatric population and often requires immediate hospitalization for proper assessment. More than 90% of the time, hip fractures are suffered by individuals older than 65 and are usually precipitated predominantly by falls. Current studies show that the average individual over 65 years falls at least once a year, and roughly 1 out of every 4 of these individuals succumb to their injuries just 12 months following surgical treatment. Moreover, timely treatment and management of these hip fractures have shown to decrease mortality by reducing cardiopulmonary and venous thromboembolic complications that often accompany hip surgeries. As a result, an emphasis on initial preoperative assessment is important to help identify the presence of ancillary factors such as preexisting comorbidities, which can impact the course of treatment. Delaying surgical management of hip fractures has been linked to decreased functional outcomes and increased mortality rates. Time, rather than technique, appears to be a recurring factor that can impact the long-term survival of these patients. The initial preoperative assessment, therefore, presents a window of opportunity where possible interventions can be made in an effort to reduce the delay of surgery, minimize postsurgical complications, and ultimately improve mortality rate among patients with hip fracture.

Keywords

fragility fractures, gait disorders, geriatric trauma, pharmacology, trauma surgery

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Introduction

By the year 2030, 20% of the US population will be considered as elderly, representing the fastest growing group in the country.¹ Typically, elderly patients fall at least once a year on average and can sustain debilitating injuries.¹ Hip fractures are a common orthopedic problem but are typically suffered by individuals over the age of 65, more than 90% of the time.^{1,2} Furthermore, hip fractures are associated with an increased risk of mortality and morbidity, thus presenting a major public health concern. Studies have shown that approximately 1 out of every 4 elderly patients who had a hip fracture usually die in a year following the incident.^{1,2} However, early and adequate intervention, which typically begins at the emergency department, may help reduce complications and improve the overall clinical outcome.

Hip fractures are a clinical emergency, with most patients requiring hospitalization.³ Feared complications following hip fractures and subsequent surgical intervention include cardiopulmonary disease and venous thromboembolism.^{3,4} To minimize the risk of developing these medical sequelae, aggressive and timely intervention is warranted. The importance of timely surgical management has been well documented in orthopedic literature.^{3,5} A generally accepted practice is to surgically manage hip

fractures within 48 hours of admission.⁵ Since most elderly patients with a hip fracture have other comorbidities, preoperative assessments can often delay surgical intervention, thus contributing to poor clinical outcomes.⁶ Vidán et al reported that mortality significantly increased in patients undergoing surgery more than 120 hours or 5 days following their initial hospital visit.⁷ Therefore, the time spent during the preoperative assessment phase may present a window of opportunity for improving time management, which may lead to better clinical outcomes. In this review, we aim to better understand the framework for this initial

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preoperative assessment and steps taken to prevent sequelae such as venous thromboembolism and cardiopulmonary disease.

Initial Preoperative Management of Geriatric Hip Fractures

The medical management of hip fractures uses a multifactorial approach and employs an evidence-based treatment algorithm.⁵ Initial assessment of the patient begins upon their arrival at the emergency department, where the patient is medically stabilized and evaluated for possible coexisting injuries. After initial stabilization, basic laboratory test results are obtained (ie, complete blood count, Basic Metabolic Panel (BMP), Prothrombin Time (PT)/international normalized ratio, and urinalysis) for assessment of anemia, renal function, and coagulation status and to document a preexisting condition. Imaging is also performed at this time. A lateral femur and an anteroposterior pelvis plain film of both hips is considered adequate in most cases.⁷

Literature on reduction of hip fractures remains controversial as older studies suggest that patients enjoy little benefit and suffer increased pain from reduction maneuvers. Current literature, however, favors earlier surgical intervention over reduction in the setting of hip fracture.⁸ In addition to providing adequate pain management, efforts are also directed toward pain control, which does not compromise mental status.⁹ Depending on the structure of the care system, the primary management team may be based on medicine or orthopedics, but geriatric fracture centers have moved toward orthopedic primary care with a comanagement model.^{7,8} This collaborative effort between geriatric and orthopedic services is effective in decreasing the overall length of stay from 4.6 days compared with a national average of 5.2 days. Additionally, readmission rates have been reduced (9.7% vs 19.4% national average) along with in-hospital mortality (1.5% vs 3.2% national average).⁷

Venous Thromboembolism Prophylaxis

Preoperative management of most orthopedic procedures are important to reduce the risk of developing potentially fatal outcomes associated with hip fracture such as venous thromboembolism. The American College of Chest Physicians recommends low-molecular-weight heparin (LMWH) for most patients for at least 10 to 14 days but possibly extending to 35 days postoperatively. The key recommendation is that prophylaxis be started 12 or more hours preoperatively, if possible.⁴ In addition, intermittent pneumatic compression devices should also be used for a minimum of 18 hours daily. These recommendations stem from pooled data of hip fracture surgery, total knee arthroplasty, and total hip arthroplasty meta-analyses, revealing the rate of fatal and symptomatic pulmonary embolism and deep vein thrombosis balanced against hazard of symptomatic bleeding events.⁴⁻⁸ The analysis showed the rate of venous thromboembolism without prophylaxis to be 4.3% in the first month after surgery but only 1.8% in the patients receiving prophylaxis with LMWH. Major bleeding events in the LMWH group were also not significantly higher (Relative Risk: .81; 95% confidence interval = 0.38-1.72).⁴

Table 1. Risk Assessment Questions.

Is the surgery high risk?
Does the patient have a history of ischemic heart disease?
Does the patient have a history of congestive heart failure?
Does the patient have a history of stroke?
Has the patient received preoperative treatment with insulin?
Is the patient's preoperative creatinine of greater than 2 mg/dL?

Adverse Cardiac Event Risk

Another important aspect of the presurgical evaluation is the cardiac evaluation. The Revised Cardiac Risk Index (RCRI) is a widely used risk prediction tool that stratifies a patient's presurgical cardiac risk of complications (third-degree heart block, myocardial infarction, pulmonary edema, and cardiac arrest) based on the patients existing comorbidities. The prediction tool, as reported by Lee et al, uses the following standard questions to assess the risk summarized in Table 1.^{10,13}

In a meta-analysis, the RCRI prediction system has performed moderately well in discriminating between low- and high-risk patients—predicting cardiac events in noncardiac surgery with relatively high fidelity in a receiver-operating characteristic-based analysis.¹¹

It is important to determine a patient's prior functional status during the preoperative cardiac evaluation. If the patient has a functional capacity of 4 or more metabolic equivalents (METs), then the patient is considered medically fit for hip fracture surgery repair.¹¹ Four METs are analogous to climbing 1 flight of stairs holding a bag of groceries, walking at 4 miles/h for 15 minutes, or performing light housework. If an accurate functional capacity cannot be obtained or it is less than 4 METs, further evaluation should be obtained such as a pharmacologic stress test.¹²

Congestive heart failure medications deserve special consideration, as heart failure incidence in the hip fracture population is twice that of nonfractured control patients.¹³ The American Heart Association/American College of Cardiology (AHA/ACC) jointly recommends the continuation of beta-blockers in all patients if already instituted. However, the current recommendation discourages the administration of beta-blocking agents on the day of surgery based on the results of the PeriOperative ISchemic Evaluation (POISE) trial, which showed a decreased number of cardiac events but an increased risk of stroke and overall mortality with new administration of these agents.¹⁴ Titrating beta-blockers over time to a goal Heart Rate (HR) between 50 and 60 is considered acceptable under these guidelines.

The AHA/ACC also recommends continuing statins and the consideration of initiation of statin therapy preoperatively because they have been shown to be acutely beneficial in patients with 1 clinical risk factor for cardiac disease.¹² In 1 meta-analysis of mostly of observational studies, there was improved perioperative outcomes including a 44% reduction in mortality with the acute administration of statin agents.¹⁵

The role of formal echocardiography for preoperative evaluation is disputed. Currently, the only explicitly endorsed indications for echocardiography prior to noncardiac surgery are

for patients with dyspnea of unknown origin and patients with current or prior heart failure with worsening dyspnea who have not had a study in the past year.¹²

Pulmonary Evaluation

Pulmonary evaluation is very important in the preoperative evaluation of patients with hip fracture because postoperative complications owing to pulmonary function are equally prevalent as those resulting from cardiac issues.¹⁶ A systematic review by the American College of Physicians (ACP) recommended all patients have an assessment of preoperative risk factors with a specific focus on COPD and congestive heart failure, which were associated with increased morbidity and mortality.¹⁶ The use of preoperative spirometry has not been shown to be beneficial in nonthoracic surgery.¹⁶ Chest radiography is not routinely used because only 0.1% of preoperative chest radiographs result in the modification of perioperative management.¹⁷ The only preoperative evaluation from a pulmonary standpoint that is categorically endorsed by the ACP is a thorough history to evaluate for chronic lung disease, a pulmonary examination and an oxygen saturation measurement.

Conclusion

Current literature confirms patients benefit from both optimal medical therapy and early surgery, which avoid the complications of prolonged hospital stays. Finding the balance between optimization of the patient's medical status and prompt, definitive surgical intervention is a key. Management of the geriatric hip fracture patient in terms of cardiopulmonary comorbidities and venous thromboembolism prophylaxis have been shown to improve patient outcomes and are endorsed by multiple professional societies.^{8,12,16} Comanagement between teams of geriatricians and orthopedic surgeons may be superior to management with either team alone as evidenced by shorter times to surgery, fewer post-op infections, fewer medical complications, and a decreased overall length of stay.¹⁸

Declaration of Conflicting Interests

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