Management of Fractures in a Geriatric Surgical Patient

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KEYWORDS

• Geriatric fractures • Early fracture fixation • Hip fractures
• Vertebral compression fractures • Lateral compression pelvic fractures

KEY POINTS

- Joint replacement surgery has increased mobility in older patients.
- Elderly patients are no longer confined to a life of inactivity; however, they are more likely to become injured and present to trauma centers for care.
- Bone aging puts the elderly patient at high risk for fractures when they are injured.
- It is important to assess adequacy of cardiovascular function in all geriatric trauma patients, particularly those with fractures.
- Lateral compression fractures are the most common injury mechanism in older patients.

INTRODUCTION

Trauma is becoming an increasingly common problem in geriatric patients, and fractures are a frequent injury sustained by the elderly. Life expectancy continues to rise. Recent advances in medical care for common problems, such as heart disease and diabetes, have allowed people to live longer and better lives. For instance, calcium channel blockers and β-blockers, medications that are part of everyday practice, have only existed for 30 years. Surgical advances, such as percutaneous treatment for coronary artery disease, as well as the recognition that coronary bypass grafting can be safely performed in elderly patients, have allowed older patients to be more active without symptoms such as chest pain or shortness of breath. Joint replacement surgery has increased mobility in older patients. Thus, elderly patients are no longer confined to a life of inactivity. They are out of their homes and interacting in the community, exercising and leading active lives. Thus, they are more likely to become injured and present to trauma centers for care.

There are several factors that predispose elderly individuals to trauma, including poor vision and slowed reflexes.[1,2] Trauma is potentially devastating to the elderly

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population owing to poor physiologic reserves and higher incidence of comorbid conditions.[3] Relatively low-energy forces can result in major injuries owing to the decreased bone density seen with osteoporosis and atrophic soft tissues.[4] These common risk factors result in recognizable patterns of bony injuries. Fractures of the hip, spine, proximal humerus, and wrist are disproportionately represented in the advanced age group.[5–7] Any one of the fractures can be a life-changing event and result in a previously independent individual falling into a pattern of hospitalization, rapid deconditioning, and generalized decline.

Bone aging, described in more detail elsewhere in this article, put the elderly patient at very high risk for fractures when they are injured. Although polytrauma fractures are present in virtually every elderly patient who is badly injured, isolated fractures from a relatively low-energy mechanism are far more common. As trauma care becomes increasingly regionalized, older patients with significant comorbidities are increasingly being referred to trauma centers. These patients are almost always admitted to the general surgery trauma service, not to the orthopedic service. Thus, it is important for general surgeons to be conversant with the issues around fracture care in the elderly. For instance, at the R Adams Cowley Shock Trauma Center last year, we admitted 6158 patients from the scene or as transfers, 1955 of whom (32%) had extremity fractures. Approximately 1300 of these patients were over the age of 65, and 426 (34%) of them sustained extremity fractures.

GENERAL APPROACH TO THE TRAUMA PATIENT WITH FRACTURES

The initial evaluation of the older patient with fractures is not different from any other trauma patient. Like younger patients, older patients are at risk for serious injury within the head, chest, abdomen, and retroperitoneum. These injuries take priority over fractures and must be addressed first. Initial care of the fractures should be to stop external hemorrhage and to perform fracture reduction when feasible. Perfusion distal to the fracture should be assessed by physical examination and/or studies such as duplex ultrasonography, compute tomographic angiography, or a catheter study.

Injury burden is magnified by presence of fractures, but the cardiovascular response to injury in older patients is blunted. Over 20 years ago, Scalea and colleagues[8] demonstrated that early invasive monitoring in high-risk polytrauma geriatric patients was associated with improved survival. In that study, patients commonly had nonhypotensive cardiogenic shock that was not recognized by measuring blood pressure, pulse rate, or urine output. Assessment with a pulmonary artery catheter was necessary to make early diagnosis and direct therapy. Philosophically, this is similar to the early goal-directed therapy described by Rivers and colleagues[9] for septic shock, a treatment strategy practiced every day. The presence of more than 1 long bone fracture places geriatric patients in the high-risk group. Thus, it is important to understand that fractures by themselves are a cardiovascular stressor. Although pulmonary artery catheters are no longer used commonly, it remains important to assess the adequacy of cardiovascular function in all geriatric trauma patients, particularly those with fractures.

SKELETAL CHANGES WITH AGING

The bony skeleton is a biologically active organ system that serves many functions. First, it provides a rigid framework for support and attachment of muscles that allow for efficient movement. Vital organs are afforded protection by bones. Bone marrow contains stem cells and actively produces multiple blood cells. The skeleton represent the body's largest store of calcium, which and is acted upon by the endocrine system to regulate serum calcium levels within narrow ranges, vital for many cellular functions.