CASE STUDY

CE 1.5 ANCC Contact Hours

Challenges in the Management of Geriatric Trauma: A Case Report

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ABSTRACT

This article describes geriatric trauma and commonly associated difficulties emphasizing both the epidemiology and assessment of geriatric trauma. There is little data guiding decisions for trauma patients 65 years or older, as there are many unique characteristics to the geriatric population, including comorbidities, medications, and the aging physiology. The geriatric population in the United States has been steadily climbing for the last 20 years and is projected to continue on this trend. Although each patient presents differently, there remains a need for the consistent utilization of standard guidelines to help dictate care for geriatric patients, particularly for patients not receiving care at a trauma center. This review uses a case study about an elderly woman with many comorbidities, followed by a comprehensive discussion of geriatric trauma and the challenges that result from a lack of guideline utilization to direct management.

Key Words

Dementia, Frailty score, Geriatric trauma, Head trauma, Traumatic brain injury

Limited data exists to guide health care providers with triage decisions for geriatric trauma patients. As such, geriatric patients should be seen at a trauma center whenever possible (Caterino, Valasek, & Werman, 2010). The data that guide the American College of Surgeons' Advanced Trauma Life Support (ATLS) course is based on information from the mid-1980s (Caterino et al., 2010). Previous and current guidelines for geriatric trauma do not incorporate new and emerging data regarding the care and outcomes of geriatric patients (Calland et al., 2012). Guidelines that have a proven capacity to improve the mortality and outcomes of geriatric patients must be utilized to direct the care of these patients. One pressing issue in current dialogue is what age qualifies a trauma patient as having a "geriatric trauma" (Kozar et al., 2015).

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The most common definition of geriatric trauma coincides with the onset of qualification for Medicare at 65 years of age; however, variation exists with a range from 50 to 75 years of age signaling the age where one would be considered a geriatric patient (Kozar et al., 2015).

Geriatric trauma patients exhibit many unique characteristics. Often, geriatric patients will have multiple comorbidities, increasing the risk of severe disability and mortality (Bonne & Schuerer, 2013). As a result of these preexisting conditions, geriatric patients are more likely to regularly take multiple medications and the response to injury can be disguised (Bonne & Schuerer, 2013). Furthermore, these preexisting diseases may reduce the patient's ability to avoid injury even when the mechanism of injury is minor. Improving current care guidelines, however, can help increase the percentage of injured geriatric patients capable of returning to their baseline activities of daily living (Bonne & Schuerer, 2013).

EPIDEMIOLOGY AND PATHOPHYSIOLOGY

The 65 years and older population is the fastest growing age group in the United States (Caterino et al., 2010). And, as a result of more active lifestyles, more geriatrics are presenting to emergency departments for trauma workups (Hammer et al., 2016). Trauma is currently the seventh leading cause of death for the geriatric population after heart disease, cancer, chronic obstructive pulmonary disease, stroke, diabetes, and pneumonia (Centers for Disease Control and Prevention [CDC], 2014).

Falling is the most common cause of geriatric trauma (Bonne & Schuerer, 2013). One in three geriatric adults fall annually (Kozar et al., 2015). The falls are often directly associated with aging issues such as gait changes, reduced reaction times, and sensory impairment (Kozar et al., 2015). On average, a single fall costs approximately $18,000 (Bonne & Schuerer, 2013; Kozar et al., 2015). Those expenses increase rapidly for patients requiring rehabilitation or admittance to a skilled nursing facility after a fall injury. Cerebral injury and long bone fractures resulting from a fall are the greatest causes of morbidity and mortality in this population (Bonne & Schuerer, 2013). Traumatic brain injuries (TBIs) are most often caused by falls for people older than 65 years (Kozar et al., 2015).

The next most common cause of trauma for the geriatric population is motor vehicle accident (Bonne & Schuerer,

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2013). Hearing and vision impairment, decreased reaction time, and cognitive dysfunction are leading causes in these accidents (Kozar et al., 2015). In motor vehicle accidents, geriatric patients will experience more significant injuries at lower speed than younger patients (Kozar et al., 2015). About 25% of geriatric patients will have chest trauma. These injuries may include flail chest and rib fractures, which can further complicate the effects of preexisting diseases, resulting in increased morbidity and mortality (Bonne & Schuerer, 2013).

There are a number of both anatomical and physiological changes that occur as a person ages, which creates a greater risk for injury and death (Heffernan et al., 2010). The physiological reserves of the human body will continue to decrease as an individual ages and will effect an outcome of a trauma (Bonne & Schuerer, 2013). These physiological changes occur even for elderly people who maintain an active and healthy lifestyle. The physiological changes are also unique to each individual; individuals may have the same chronological age, but the differences in their physiology may be vastly different (Joseph & Hassan, 2016).

CASE STUDY

Background

The patient was an 88-year-old Caucasian woman who presented to the emergency department after a motor vehicle accident where she was a nonrestrained driver involved in a head-on collision with no airbag deployment. A cervical collar was in place, and she complained of right shoulder and upper arm pain. Her medical history included hypertension, hyperlipidemia, and coronary artery disease post-stent placement. She was currently taking clopidogrel.

Paramedics reported that the patient was very confused and did not remember getting into her car and driving on the highway. She thought she had a syncopal event. She denied drinking, smoking, or using illicit or recreational drugs. The last thing she remembered was taking items out of her storage shed and putting them in the trunk of her vehicle. Her physical examination findings included the following:

Vital Signs

Initial vital signs: blood pressure, 128/86 mmHg; pulse, 70; respirations, 20; pulse oximetry, 97% on room air; and body temperature, 97.5°F.

Head/Eyes/Ear/Nose/Throat/Mouth/Neck

Head was normocephalic. Conjunctivae, extraocular movements, and lids were normal. Pupils were equal, round, and reactive to light. There was a 1- to 2-cm laceration superior to the left lateral eyebrow with surrounding soft tissue swelling and developing ecchymosis. Bilateral tympanic membranes, external ears, and ear canals were normal. Bilateral nares patent, and mucus membranes pink and moist. Uvula was midline, and oropharynx was clear and moist. Perioral region had questionable developing ecchymosis with multiple tongue contusions. Trachea was midline. Midcervical tenderness on palpation with no palpable deformity.

Cardiovascular/Respiratory

Normal heart rate, regular rhythm, and normal S_1–S_2 sounds heard on auscultation. Bilateral breath sounds, clear to auscultation bilaterally. Normal effort upon breathing. Chest wall appeared atraumatic with no palpable deformity.

Abdominal

There was tenderness in the right lower quadrant, suprapubic area, left upper quadrant, and left lower quadrant. There was no rigidity, rebound, or guarding. Abdominal wall appeared atraumatic.

Musculoskeletal

All four of her extremities were warm and well perfused, and her range of motion and neurosensory were intact. She had positive tenderness mid- to lower thoracic spine with no palpable deformity. Her right shoulder had tenderness that extended into the proximal humerus. She also appeared to be developing knee contusions bilaterally.

Neurological

Her Glasgow Coma Scale (GCS) score was 14/15. She was oriented to person. She was confused about the time and place when she first arrived but had since remembered after she was reoriented. The patient was speaking without slurred speech. She was alert, her eyes were open, and she was able to follow verbal commands without difficulty.

Outcome

The patient was initially seen in an emergency department of a trauma center, and a workup for a geriatric trauma was performed. She was then transferred to a step-down unit by the trauma service. Consults for cardiology and neuropsychology were also placed. This case study-based review is an overview of the workup for geriatric trauma and the challenges of not utilizing guidelines to help manage treatment.

ASSESSMENT

The current recommendation by the CDC and the American College of Surgeons Committee on Trauma (ACSCT) is that because of the increased vulnerability to injury, patients 55 years or older should be cared for at highest

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level trauma centers (Kodadek, Selvarajah, Velopulos, Haut, & Haider, 2015). Unfortunately, studies suggest that this is not happening, or they are being treated using "standard" criteria, causing many geriatric traumas to be "undertriaged," (Ichwan et al., 2015; Kodadek et al., 2015). These studies indicate that the problem is nationwide. More than half of significantly injured geriatric patients in the United States are receiving medical care at nontrauma centers (Kodadek et al., 2015). This is likely because no guidelines exist to guide emergency departments during triage of geriatric patients.

Guidelines for the management of geriatric trauma patients have been developed by both the Eastern Association for the Surgery of Trauma (Calland et al., 2012) and the Trauma Quality Improvement Program (TQIP) of the American College of Surgeons. The TQIP agrees that geriatrics are often undertriaged and therefore propose a lower threshold for a trauma activation (ACSCT, 2015). This type of activation would also require the patient to be cared for in a trauma center. Many facilities are without the same resources that trauma centers possess, and these guidelines do little to help other facilities when receiving a geriatric trauma patient.

Injury Predictors

With limited knowledge and use of current guidelines for the management of geriatric trauma, many facilities use indicator scales to predict patient outcomes and mortality. One commonly used indicator is the injury severity scale (ISS), which is a tool used to describe a patient with multiple injuries who is being evaluated. The accuracy of this scale has been validated in younger patients in previous studies (Joseph & Hassan, 2016). This scale is not as consistent with the geriatric population because of the difference in their physiology and therefore this tool should not be used (Joseph & Hassan, 2016). Up to one third of the patients presenting after a trauma will have an ISS that equates to the dying during their current admission (Bonne & Schuerer, 2013). The case study patient would score low on the scale, meaning she would have a good chance of survival.

Another indicator implemented in medical centers is frailty. Frailty provides an indicator of deterioration resulting from aging and is a better indicator of patient's outcomes than age alone (Kozar et al., 2015). Because there are no standardized guidelines, multiple indexes and scales for frailty exist leading to discontinuity of care of geriatric patients from across medical facilities (Joesph & Hassan, 2016). Many of these scales, such as the Simplified Acute Physiology Score II, Mortality Probability Model II (at 0 and 24 hr), and ISS are inefficient and impractical in trauma settings.

The 50-variable frailty scale was shortened and validated to the 15-variable Trauma-Specific Frailty Index (TSFI). This abridged index allows clinicians to predict the possible discharge disposition of the geriatric patient efficiently and effectively even in trauma settings (Joseph & Hassan, 2016). The TSFI can provide critical insight into the wide range of resources necessary and appropriate for a particular patient's care (Joseph et al., 2014). The case study patient's score on the TSFI would be 4.25 out of 16.5, which indicates a good outcome, but could have potential problems that may need attention at discharge.

Laboratory Values

Laboratory and diagnostic tests are means of gaining more insight into a patient's condition (Fischbach & Dunning, 2009). Alone, these tests are not very helpful. Complemented with a quality physical examination and thorough understanding of the patient's medical history, they can be critical in diagnosis (Fischbach & Dunning, 2009). A complete blood cell count, chemistry, comprehensive metabolic panel, troponin, coagulation studies, and lactate data were collected for the case study patient. Of these, the only abnormal value was an elevated blood urea nitrogen level at 28 mg/dl. International normalized ratio was 1.0 L and lactate level was 1.1 mmol/l. Troponin was negative. Ethanol and other drugs also tested negative. A urine analysis showed no sign of infection.

Clinical assessments of geriatric patients may be more difficult when there are comorbidities and one or more medications for these conditions. β-Blockers, in particular, may mask changes in vital signs and prevent identification of hemorrhagic shock (Sadro, Sandstrom, Verma, & Gunn, 2015). As such, blood tests (e.g., base deficit, serum lactate) should be evaluated to assess for occult hypoperfusion (Sadro et al., 2015). Thresholds for treating shock are different between geriatric and younger trauma patients. For example, treatment of a geriatric trauma should be initiated when systolic blood pressure is less than 110 mmHg rather than less than 90 mmHg as is recommended in younger patients (Sadro et al., 2015). Furthermore, pain is often underreported in geriatric patients because of the changes in their physiology that impairs their perception of pain, thus increasing the risk of undiagnosed injuries (Sadro et al., 2015).

Diagnostic Testing

Radiologists are crucial in the care of a geriatric trauma patient because injury patterns are vastly different from those of younger patients and significant injury may result from a minor mechanism of injury (Sadro et al., 2015). Computed tomography (CT) is the primary imaging modality used for geriatric traumas, but implementation requires knowledge of the patient's renal function before imaging with contrast (Sadro et al., 2015). Age is not a risk factor for contrast agent-induced nephropathy, but geriatric patients do have a higher risk of having a comorbidity

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of renal insufficiency (Sadro et al., 2015). Imaging should still be performed even when it appears there may not be an injury.

National guidelines recommend that all minor head traumas be evaluated using a head CT scan (ACSCT, 2014; CDC, 2012; Sadro et al., 2015). As rapid deterioration is a significant concern, patients with head injuries should be directed to a trauma center as soon as possible (ACSCT, 2014; CDC, 2012; Sadro et al., 2015). The GCS is used to evaluate the mental status of a patient based on their eye response, verbal response, and motor response. A score of 15 being no deficit, and anything less than 8 will require intubation for airway protection (Sadro et al., 2015). Studies have shown that 14% of geriatric patients with minor head trauma and a GCS score of 13–15 had an abnormal head CT scan (Sadro et al., 2015). Of this sample of geriatric patients, 21% required surgical intervention (Sadro et al., 2015). Up to 21% of patients with intracranial injuries had a normal GCS score, no neurological deficits, no alcohol use, and no anticoagulant use (Sadro et al., 2015). The only clinical findings were scalp contusions or lacerations (Sadro et al., 2015). When patients have an immediate head CT scan, they are more likely to be able to return to their baseline living situation if treatment is started promptly (Sadro et al., 2015).

The patient in the case study exhibited obvious head trauma and an initial GCS score of 14/15. Following national guidelines, she underwent a head CT scan. The initial scan showed no bleeding in her brain; however, the obvious head trauma was read as a left frontal hematoma. The patient was admitted to a step-down unit where neurological checks were frequent, and a repeat head CT scan was performed 12 hr later. The follow-up head CT scan was also negative for bleeding. However, the patient remained closely monitored as clopidogrel, an antiplatelet agent that can increase the risk for bleeding, was listed as one of her regular medications.

Anticoagulants and Antiplatelets

The number of patients taking anticoagulants and antiplatelet agents has been increasing, which is an overall benefit for the patient with cardiovascular and/or cerebrovascular diseases (Calland et al., 2012). In trauma, however, the risk for hemorrhage after an injury is increased and may affect the healing process (Calland et al., 2012). Therefore, a proper and early assessment to correct these coagulopathies is necessary (Calland et al., 2012). For patients taking an anticoagulant, the risk of intracranial hemorrhage is much higher, as is the potential for fatality (Sadro et al., 2015). A patient known to be taking anticoagulation medication should have a head CT scan performed regardless of head trauma (Sadro et al., 2015).

Improved outcomes for geriatric trauma patients have been associated with having a protocol in place for rapid anticoagulation reversal (ACSCT, 2015). Each center should have a protocol based on availability of products, costs, and facility preferences (ACSCT, 2015). These protocols have shown the potential to reduce mortality by up to 75% (Calland et al., 2012). Very little is known about the reversal of antiplatelet medications during a trauma, as most of these medications are new themselves. Most trauma centers already have a warfarin reversal protocol, as this medication has been around the longest. Dabigatran does not have a reversal agent, but most commonly dialysis is an option (ACSCT, 2015). Clopidogrel and aspirin also have no reversal agents, but as these are platelet antagonists, platelet transfusions and desmopressin may be used when bleeding is significant (ACSCT, 2015).

Evidence of a cranial bleeding requires immediate reversal of the coagulopathy because the risk of an intracranial injury usually outweighs the risks for anticoagulation therapy (Sadro et al., 2015). Even if the head CT scan shows no indication of bleeding, the patient should be monitored in an intensive care setting for at least 24 hr, as the risk of bleeding remains high; however, no reversal of medication is required (Sadro et al., 2015). A follow-up head CT scan should be performed immediately upon any indication of clinical deterioration (Sadro et al., 2015).

Dementia Versus Concussion

The patient in the case study had been living at home independently by herself. She did not remember the incident leading to her admission to the emergency department. Considering the events leading to this, it is probable that she had a concussion. Because of her age, however, the medical providers also assumed that she suffered from dementia. Dementia does put patients at risk for a trauma because of the lack of recognition of risk (Mirick & Wood, 2014). Even if this was the case, there is a possibility that trauma patients with dementia may achieve similar outcomes as geriatric patients without cognitive disabilities (Yelon & Luchette, 2014). Dementia is not an independent predictor of mortality according to the largest study to date for trauma in patients with dementia (Yelon & Luchette, 2014). The study further suggests that treatment of geriatric patients should not be limited by their cognitive abilities and that utilizing the guidelines for geriatric trauma will also benefit patients with already diagnosed dementia (Yelon & Luchette, 2014).

Traumatic brain injuries are significant among the geriatric population, especially in falls and motor vehicle crashes (Papa, Mendes, & Braga, 2012). Most TBIs are mild, which means the GCS score was 13–15; moderate is a GCS score of 9–12, and severe is a GCS score of 3–8 (Papa et al., 2012). The case study patient falls under the mild TBI category, hence the reason for the neuropsychology consult.

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Overall, geriatric patients will have worse outcomes after a TBI, and these outcomes include higher mortality and functional disability (Papa et al., 2012).

Age-related issues make assessing TBI severity difficult in geriatric patients (Papa et al., 2012). Atrophy of the brain, which creates more space inside the cranial vault, makes early diagnosis postinjury difficult (Papa et al., 2012). The increased cranial space effectively masks bleeding or swelling, essentially delaying manifestation of external/physical or neurological symptoms (Papa et al., 2012). Thus, patients could have a bleed in their brain or a contusion and present no signs or symptoms (Papa et al., 2012). A TBI (even mild cases) reduces cognitive performance (e.g., language, memory, and executive function; Papa et al., 2012). This may delay discharge from the hospital because patients may not be able to go back to their baseline living situation.

Patient's Final Outcome

The case study patient was discharged to a subacute rehabilitation center per the recommendations from the physical and occupational therapy staff. Her neuropsychology evaluation indicated that she lacked the cognitive capacity to make informed decisions. Follow-up TBI assessments with the neuropsychology team postdischarge were recommended. Although this patient did not require invasive treatment, she did present with many of the challenges common among geriatric patients.

Notably, she suffered from comorbidities and her medication regimen included an antiplatelet medication. She had memory issues upon arrival that persisted throughout her stay, making a final diagnosis difficult. Finally, she was not discharged back to her baseline living situation, instead, requiring additional resources to help accommodate her in a subacute rehabilitation facility. Each of these issues is unique to each geriatric patient, dictating the appropriate course of care.

REFLECTION

A myriad of solutions are available to address the challenges of geriatric trauma, the most costly option being a geriatric trauma center. In Germany, more than 100 hospitals have applied for a certification as a geriatric trauma center. In these centers, geriatricians leading multidisciplinary teams for the management of geriatric traumas are available round the clock (Pape et al., 2014). Access to experts in geriatric care likely improves the overall outcomes for geriatric patients.

Recent studies indicate that incorporating geriatric consultation in a patient's plan of care may improve recovery after being admitted for a trauma (Min, Cryer, Chan, Roth, & Tilou, 2015). The patient in the study case presented here would undoubtedly have benefited from a geriatric consult. This would have been particularly beneficial in making a final determination of dementia versus a concussion. Teams of expert providers such as those employed in Germany would help provide input on both of these diagnoses. Having a dedicated geriatric trauma team including multidisciplinary team members would be more beneficial to the patient's outcomes and more cost-effective for the health system (DeLa'O, Kashuk, Rodriguez, Zipf, & Dumire, 2014).

Survival rates for geriatric trauma patients at a trauma center are 30% higher than patients not treated in a trauma center (Sadro et al., 2015). This may or may not be due to the availability of resources as a trauma center. The consistent utilization of guidelines for geriatric trauma would certainly help increase the survival rate of geriatric patients who sustain trauma at other institutions as well. Furthermore, implementing standardized criteria and guidelines for geriatric patients would be the easiest and most cost-effective solution to improving the outcomes for this population.

Geriatric patients are difficult patients to manage because of their comorbidities, their medication lists, and the physiology of aging. Geriatric patients are being undertriaged and therefore are not receiving the appropriate care that they need. As the population continues to age, there will be more geriatric patients sustaining trauma and they need to be cared for by a geriatric trauma guideline that will provide the appropriate management. Emergency department staff and trauma care providers must be educated as to the availability of guidelines for the management of geriatric trauma and should be trained to properly manage these patients according to the guidelines.

KEY POINTS

- Geriatric traumas are difficult to manage because of the changing physiology of aging adults. Comorbidities also contribute to the difficulties of management, especially when these conditions are not known from the start of care.
- Currently, guidelines to manage care for geriatric trauma patients are not consistently utilized and older adults who sustain trauma often are not receiving the care that is required, which causes injuries to be missed.
- More studies are needed to create improved, evidence-based guidelines that can be utilized to care for geriatric trauma patients. The geriatric population has been growing rapidly, and they need proper care to maintain their quality of life.

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