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Geriatric Trauma: A Clinical and Ethical Review

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ABSTRACT

Because of advances in medicine and other sciences, the average human life span is longer now than any other time in history. The physiologic effects of aging as well as multimorbidity, polypharmacy, and other geriatric-specific syndromes create additional challenges when elderly patients experience a traumatic injury. However, there is a growing evidence base that can inform the clinical decision-making process. This narrative review of the literature addresses the state of the science regarding geriatric syndromes, guidelines and protocols, indices and models for prognostication, outcomes and ethical concerns in the treatment of geriatric trauma.

Key Words

Ethics, Frail elderly, Geriatrics, Trauma

Advances in medicine and other sciences have increased the average chronological life span and have improved the ability to provide early resuscitation and rescue efforts to those traumatically injured. The elderly (described as persons aged 65 years and older for the purpose of this discussion) face an increased risk of mortality and are prone to worse outcomes than younger persons when traumatically injured. This is likely due to multiple factors including comorbidity, polypharmacy, and the physiologic effects of aging (Bradburn et al., 2012).

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To provide high-quality care and promote appropriate medical decision making for older adults, clinicians must consider the additional complexity that arises when caring for the geriatric trauma patient. This narrative review of the literature addresses available information regarding outcomes for geriatric trauma patients, geriatric-specific concepts or syndromes, guidelines and protocols for optimizing care for the population, indices and models for prognostication, and ethical issues that arise in care of the traumatically injured geriatric patient. Inclusion criteria for the literature search included peer-reviewed scholarly publications and society guidelines published since 2003 that addressed geriatric(s)/elderly trauma/injury. The review also includes foundational information from several classic peer-reviewed publications and books.

OUTCOMES FOR GERIATRIC TRAUMA PATIENTS

Despite improvements in access to trauma care and general medical advances in recent history, elderly patients who experience traumatic injury still remain at high risk for poor outcomes, ranging from loss of independence to death. A 2010 study examined the functional status of geriatric trauma patients 1 year after acute injury and found a statistically significant number of patients experienced loss of the ability to perform at least one activity of daily living (Kelley-Quon et al., 2010). This functional loss presumably places the patient at risk for further decline, which could lead to further loss of independence or even death, not to mention the likely impact on quality of life. There is evidence that although elderly injury survivors can and do achieve independent living again, they are often left with significant disability, which directly impacts their quality of life (Inaba, Goecke, Sharkey, & Brenneman, 2003).

A systematic review of mortality outcomes associated with geriatric trauma revealed an overall rate of approximately 15%, with outcomes significantly worsening for those patients older than 74 years (Hashmi et al., 2014). This study also demonstrated worse outcomes for those elderly patients with higher Injury Severity Scores (ISS) and lower systolic blood pressure. Accordingly, a 10-year retrospective study examined the long-term outcomes for geriatric trauma patients admitted with severe injuries and found the mortality rate of this population in-hospital was

33%. The authors, however, presented a different perspective choosing to highlight the significant number of patients who survived and were able to eventually return home (Grossman, Ofurnum, Stehly, & Stoltzfus, 2012). Quality of life and independence were not specifically evaluated or mentioned in this study. Understanding the risk factors for poor outcomes and developing geriatric-specific interventions are essential to ensuring optimal care for older adults. Such interventions should incorporate geriatric-specific concepts. Below we define these core concepts and then describe how they impact the delivery of high-quality trauma care via guidelines, protocols, and other interventions.

GERIATRIC-SPECIFIC CONCEPTS

There are a number of health concerns for aging adults that have complex, multifactorial causes. Health care professionals who provide care for the aging adult have come to identify these concerns as "geriatric syndromes" (Inouye, Studenski, Tinetti, & Kuchel, 2007). Some of the recognized geriatric syndromes include pressure ulcers, incontinence, falls, functional decline, and delirium. Numerous other such syndromes likely exist but have not been adequately researched or described. Providing appropriate care to the geriatric patient who has undergone a traumatic injury requires health care providers to consider these syndromes and their effect on older adults.

Clinicians must also consider the concept of multimorbidity in the care of elderly patients. The prevalence of multiple chronic conditions such as diabetes, congestive heart failure, chronic obstructive pulmonary disease, and end-stage renal disease in the elderly makes trauma care and decision making more complex. Guidelines from the American Geriatric Society encourage a treatment approach that considers all relevant medical problems and invites the discussion of key concepts such as patient preferences, relevant evidence, prognosis, and relative benefits versus harms, as well as continual reassessment (American Geriatrics Society, 2012).

Trauma prevention is also a vital component of any trauma-focused care delivery system. Targeted education for elders, which specifically addresses some of these syndromes, which contribute to injury, like falls, can help improve outcomes and prevent harm (Corman, 2009).

GUIDELINES AND PROTOCOLS FOR OPTIMIZING CARE FOR THE POPULATION

There has been a recent increase in attention to optimizing care for geriatric trauma. In 2012, the Eastern Association for the Surgery of Trauma published a comprehensive review of over 400 articles regarding the management of geriatric trauma patients that included several specific recommendations for care (Calland et al., 2012). First, aggressive triage of elderly trauma patients to appropriate centers of care is recommended as well as an aggressive initial treatment approach unless otherwise contraindicated in the judgment of the trauma surgeon (Calland et al., 2012). Because of the risk of postinjury hemorrhage for older patients secondary to physiology and medically induced anticoagulation, the early assessment and correction of coagulopathies is also recommended, although there is insufficient evidence to establish absolute parameters and timeframes (Calland et al., 2012). The 2011 Guidelines for Field Triage of Injured Patients from the Centers for Disease Control, however, does specifically recommend transporting any patient with a head injury who is on anticoagulants to a trauma center due to the high risk for rapid deterioration (American College of Surgeons, 2014). Finally, limitations on care should be discussed and initiated when the prognosis for the patient is extremely poor (Calland et al., 2012).

In an effort to provide better care for the geriatric trauma patient, some organizations have instituted a geriatric trauma-specific unit or service line such as the G-60 model utilized by Dr. Mangram and colleagues at the John C. Lincoln North Mountain Hospital in Phoenix, Arizona (Mangram, 2013). This interdisciplinary model led by trauma surgeons acknowledges the challenges of caring for the geriatric trauma patient and devotes resources, specifically to improving outcomes and better understanding this population. Geriatric-specific trauma centers are also being created throughout the world. As of a 2014 publication, over 100 hospitals in Germany had applied for certification as geriatric trauma centers. In these centers, geriatricians, who are available 24 hours a day, 7 days a week, lead the multidisciplinary management of elderly trauma patients. Patients receive care from specially trained nurses, enjoy rooms designed to promote social interaction with others, and experience coordinated care with nursing homes and other acute care facilities at the time of discharge (Pape et al., 2014).

In collaboration with their physician colleagues, nurses are also attempting to impact the trajectory of the geriatric trauma patient. For example, nurses were instrumental in implementing and evaluating a Virtual Geriatric Trauma Institute in a Pennsylvania trauma center (Katrancha & Zipf, 2014) and a Geriatric Resuscitation Protocol in Colorado (Bourg, Richey, Salotollo, & Mains, 2012) in efforts to improve outcomes for this population. Unfortunately, many nursing programs to date have not provided education regarding the unique challenges facing the geriatric patient, so novice and even expert nurses may feel lacking in their abilities when dealing with this population. Case studies can help to bridge the education gap by presenting nurses with a real scenario that discusses the factors that can impact the ability of the elderly person to heal and return to function after traumatic injury (Resnick, 2011). In response to 2010 and 2012 recommendations

from the American Association of Colleges of Nursing (AACN), many nursing undergraduate and graduate education programs are also now beginning to emphasize didactic learning and clinical experience regarding geriatric patients (AACN, 2010a, 2010b).

Other programs are meant to improve outcomes for geriatric patients by acknowledging these syndromes and developing evidence-based best practice guidelines for preventing and treating them (Maxwell, Mion, & Minnick, 2013). Although developed for more general populations, these programs have the potential to improve care for trauma patients and deserve further attention. For example, the Hospital Elder Life Program (HELP) specifically focuses on the problem of delirium in the hospital setting, which all patients, especially the elderly, are at risk for developing (The Hospital Elder Life Program, n.d.). The ABCDE Bundle (Awake and Breathing Trial Coordination, Choice of Sedative, Delirium Detection, and Early Progressive Mobility and Exercise) developed by the American Association of Critical-Care Nurses is another example of targeted interventions to prevent, detect, and treat issues, like delirium, in patients (Bell, 2011). Acute Care for Elders (ACE) units or service lines have also been utilized within acute care hospitals to improve outcomes for all geriatric patients. These care units or service lines are composed of team members who have an increased awareness, and often education, regarding the complexities of caring for older patients, including the care of the geriatric syndromes (Barnes et al., 2012). Despite the success of these programs for geriatric patients in acute care settings, the application of these guidelines to the injured patient are further complicated by factors such as severe pain, immobilized limbs, the effects of analgesia and sedatives, and therapies such as continuous dialysis, ventilation, and repeated trips to the operating room. Although these programs could potentially provide benefit for the geriatric trauma population, there is no available evidence demonstrating their use in this setting.

INDICES AND MODELS FOR PROGNOSTICATION

When discussing outcomes for trauma patients, it can be helpful to have measurement tools to provide information about probabilities for recovery and return to function. One common tool regularly used to describe the trauma a patient has sustained is the Injury Severity Score or ISS (Baker, O'Neill, Haddon, & Long, 1974). This tool is also utilized in benchmarking data for trauma programs across the country. A numeric score of 0–75 is assigned to a patient with regard to their particular injuries, and the numeric score is further tied to a specific group injury rating of minor, moderate, severe, or very severe. The American College of Surgeons Committee on Trauma has indicated that fatal outcomes increase for all severity levels for patients older than 75 years (American College of Surgeons, 2010). However, a limitation of the ISS is that it does not take into account any confounding factors for the patient such as comorbidities, polypharmacy, or syndromes related to aging, and therefore may be less able to account for important predictors of mortality in the elderly.

A more novel approach to prognostication in trauma care is the Frailty Index. The original index developed by Searle et al. has been used in other settings to predict the risk of death based on what they describe as deficits of health; however, until recently it was not adapted to the trauma patient (Searle, Mitnitski, Gahbauer, Gill, & Rockwood, 2008). In 2014, the 15-variable Trauma-Specific Frailty Index was validated as a reliable instrument for predicting "unfavorable" discharges for elderly trauma patients including death and discharge to a skilled nursing facility (Joseph et al., 2014). Likewise, although most commonly utilized with uninjured geriatric populations, the Vulnerable Elders Survey or (VES)-13 has recently been studied as a potential tool for anticipating morbidity and mortality with geriatric trauma patients (Min et al., 2011). Further research on both these tools and the synergistic use of them with the ISS in evaluating these patients is needed.

Predictive models, which could further impact the care of the geriatric patient, are also being developed in trauma systems outside the United States. In an effort to acknowledge, understand, and direct the multifaceted nature of geriatric trauma care, researchers in Norway have created a survival prediction model that incorporates anatomic injury, physiology, age, and comorbidities (Jones, Skaga, Søvik, Lossius, & Eken, 2014). Further testing is necessary to determine whether use of this model could be applied to trauma patients in other countries. The development of this tool represents another meaningful effort of trauma practitioners to develop guidelines and instruments to inform care of the injured elderly.

ETHICAL ISSUES

Determining the best course of treatment for a geriatric trauma patient is difficult. Because of the important contributions of geriatric syndromes and multimorbidity, age alone is not predictive of outcomes for these patients. Ethicist Daniel Callahan has argued, "There is an important difference between taking age into account in order to provide the most appropriate treatment and the use of age as a standard for the discriminatory denial or modification of treatment" (Callahan, 1987, p. 55). On the one hand, there is evidence that older adults do benefit from aggressive trauma care. On the other hand, older adults often encounter trauma in the setting of multiple comorbidities, variable functional status, and shorter life expectancy. In addition to age and comorbidities, there are important ethical considerations regarding advance

directives, patient preferences, surrogate decision making, and patient best interests.

When patients initially arrive in the emergency department for trauma care, families and practitioners often instinctively pursue aggressive and invasive treatment options. Despite high rates of morbidity and mortality for this population, evidence suggests early aggressive triage and treatment is defensible for a number of reasons. First, patients, including the elderly, triaged appropriately to receive care at a trauma center have an overall risk of death 25% lower than those treated at nontrauma centers (MacKenzie et al., 2006). Likewise, early prognostication tools such as injury severity and preinjury comorbidities alone are imperfect at predicting outcomes (Duvall et al., 2015); therefore, aggressive and invasive care can be appropriate. Finally, overall costs and resource utilization for aggressive treatment of elderly trauma patients do not exceed accepted thresholds despite higher mortality rates among this population (Zarzaur, Magnotti, Croce, Haider, & Fabian, 2010). Situations may exist, however, when aggressive care is not advisable from a practitioner standpoint or is not desired from a patient/surrogate standpoint.

Decision making must include careful consideration of quality of life of the patient who has already achieved an advanced age. Although, as previously mentioned, some predictive models and conceptual frameworks exist to help guide practitioners in initiating quality of life discussions with patients and families, no method is universally accepted or utilized. Promoting ongoing quality of life for the patient can be achieved through engaging patients and surrogates in a discussion of risks and benefits of treatments and their alternatives (Beauchamp & Childress, 2013) as well as the patient's understanding of life goals and values.

In trauma care, consideration of the person and the injury process as a whole is vital. Surgical repair of injury is often achievable in the short term; however, the need for extensive rehabilitation and the possibility of decreased independence or diminished quality of life in the future must be addressed and readdressed frequently throughout the acute treatment phase. Likewise, older patients may receive life-saving care in the hospital, but may struggle to find affordable and appropriate home care or rehabilitation options, which may contribute to frustrations for the patient and unanticipated burdens for family members (Callahan, 1987).

In some cases, clinicians may determine that continued care of a trauma patient is unlikely to prolong survival. In other cases, clinicians, families, or patients may determine that the burdens of treatment outweigh the benefits. In these cases clinicians and surrogates should engage in discussions surrounding withdrawal or withholding of life-sustaining treatment and provision of comfort care. The maintenance of biological life and the initiation or continuation of treatment without regard for pain, suffering, or discomfort of the patient is not morally or ethically required (Beauchamp & Childress, 2013). In such cases, early involvement of hospice, palliative care, and ethics consultation services for those patients also serves to promote beneficence and nonmaleficence in the acute care setting (Sise et al., 2012).

During early resuscitation and rescue efforts, elderly patients may not have decision-making capacity due to the severity of their injuries. Advance directives, such as living wills, health care proxies, and physician orders for life-sustaining treatment can help physicians and families in the decision-making process. The goal of these documents is to incorporate the patient's own preferences into decision making. Physicians can promote the autonomy of the incapacitated patient and demonstrate the ethical standard of respect for persons by utilizing these documents when planning for and initiating treatment (Lo, 2013).

When patients remain unable to express their preferences, clinicians must involve surrogate decision makers. Family members most often serve as surrogates for patients; however, court-appointed guardians may also be utilized in the event of unresolved conflict regarding patient care (Sise et al., 2012). Guardianship may also be sought in the case of the unbefriended older adult (Bandy et al., 2014). Trauma clinicians should be aware of the laws of their state regarding surrogate decision making and should inform and collaborate with surrogates to determine the plan of care. Surrogate or proxy decision making has been endorsed through the court system in several landmark cases (i.e., *Quinlan* and *Cruzan*) and is considered justified due to the claim that all patients have the right to refuse medical care and that a person or persons who know a patient well could reasonably make the same decision the patient would make if they could express their thoughts (Emanuel & Emanuel, 1992). Once a surrogate has been identified, physicians can utilize several avenues to enhance the decision-making process. Holding a family meeting can be a helpful way to promote better communication and understanding. In this meeting, physicians and surrogate decision makers will typically discuss the patient's current status and treatment options in light of their known preferences. Physicians can and should give specific recommendations based on their knowledge of the medical information as well as any patient preferences. Reminding everyone in the decision-making process that all decisions should be based on the patient's preferences and best interests is also important. Other health care workers such as nurses, chaplains, and social workers can help support the physician, family, and patient during times of difficult decision making.

AREAS FOR FUTURE RESEARCH

Numerous opportunities exist for further research in the area of geriatric trauma. Geriatric models of care such as

ACE and HELP could be formally evaluated in a trauma population. The development of new protocols and algorithms to reduce variability of care is also important. For example, with the recent FDA approval of idarucizumab, opportunities now exist to create protocols for the reversal of the oral anticoagulant dabigatran (U.S. Food and Drug Administration, 2015). Research regarding injury prevention and education will also continue to remain foundational to the care of these patients. As the care of elderly injured patients advances, interested clinicians will no doubt easily identify other areas of future research.

CONCLUSION

In summary, care for the geriatrics trauma patient often takes place in the setting of geriatric syndromes and multimorbidity, which complicate both patient management and decision making. Although some geriatric tools and interventions have been applied to the trauma setting, other models exist, which have the potential to enhance trauma care for older adults but have not yet been implemented in the trauma setting. Future research and implementation programs are needed so that geriatric principles are incorporated more fully into the care of older adults after trauma.

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