

Trauma Clinical Guideline: **Geriatric Trauma Care**

The Trauma Medical Directors and Program Managers Workgroup is an open forum for designated trauma services in Washington State to share ideas and concerns regarding the provision of trauma care. The workgroup meets regularly to encourage communication between services so that they may share information and improve quality of care. On occasion, at the request of the Emergency Medical Services and Trauma Care Steering Committee, the group discusses the value of specific clinical management guidelines for trauma care.

This guideline is distributed by the Washington State Department of Health on behalf of the Emergency Medical Services and Trauma Care Steering Committee to assist trauma care services with developing their trauma patient care guidelines. The workgroup has categorized the type of guideline, the sponsoring organization, how it was developed, and whether it has been tested or validated. This information will assist physicians in evaluating the content of this guideline and its potential benefits for their practice and patients.

The Department of Health does not mandate the use of this guideline. The department recognizes the varying resources of different services, and that approaches that work for one trauma service may not be suitable for others. The decision to use this guideline in any particular situation always depends on the independent medical judgment of the physician. We recommend that trauma services and physicians who choose to use this guideline consult with the department regularly for any updates to its content. The department appreciates receiving any information regarding practitioners' experiences with this guideline. Please direct comments to 360-236-2874.

This is a trauma assessment and management guideline. The trauma medical directors group reviewed the guideline, sought input from trauma care physicians throughout Washington State, and used that input to make changes. Both the Emergency Medical Services and Trauma Care Steering Committee and the Department of Health Office of EMS/Trauma Section endorsed the guideline. This guideline has not been tested or validated.

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The Problem

The elderly population in the United States is steadily increasing and, as a result, so too are the number of elderly trauma victims. Elderly trauma patients account for 25 percent of injury fatalities per year and consume 33 percent of the health care resources spent on trauma care. Several studies have demonstrated increased morbidity and mortality for geriatric trauma patients compared to younger cohorts. Elderly patients can sustain a significant injury with even a minor mechanism such as a fall from standing. Thus, the health care provider may be prone to underestimate the severity of injury. In addition, elderly patients are commonly hypertensive and thus a “normal” blood pressure may represent relative hypotension that may be underappreciated. Elderly patients often have medical co-morbidities that complicate their care, and may take medications such as beta blockers that impair their ability to respond to a hypotensive event. The high rate of coumadin and anti-platelet agent use in this population can also increase the risk of either systemic or intracranial hemorrhage. This guideline has been devised to alert the health care provider of the special considerations surrounding the care of geriatric patients following injury. The definition of the “geriatric” age group varies throughout the literature but for the purposes of this guideline we will use the most commonly accepted age range of greater than or equal to 65 years.

Triage of Elderly Patients

Early aggressive trauma care has been shown to improve outcome for geriatric patients with survivable injuries, yet elderly patients are more likely to remain in their community and receive care at a non-designated trauma service. Recognition of the increased risk of poor outcome in this population should prompt consideration of early transfer to a higher level of trauma care unless the family or patient has decided not to pursue aggressive resuscitation efforts. Advanced age alone should not be used as the sole criterion for denying or limiting care in this patient population. With the exception of patients who are moribund on arrival, an initial aggressive approach should be pursued as the majority will return home and up to 85 percent will return to independent function.

Changes in physiologic response

The following factors should be considered when evaluating a geriatric patient after injury:

1. By age 65, 50 percent of the population has coronary artery stenosis.
2. Cardiac index declines linearly with age and the maximal heart rate begins to decline after age 40. Significant blood volume loss may be masked by the absence of early tachycardia. This can be further compromised by pre-injury beta blocker therapy.
3. Systolic blood pressure generally increases with age such that a systolic blood pressure of 120 mm Hg may represent hypotension in an elderly patient whose pre-injury blood pressure was 170 to 180 mmHg.
4. The kidney begins to lose nephron units after age 50 resulting in a decline in glomerular filtration rate and creatinine clearance. The aged kidney is thus more susceptible to hypovolemia.
5. Elderly patients are at increased risk for hypothermia because of decline in thermoregulatory ability.

As a result of this loss of physiologic reserve and the fact that early shock can be underappreciated in the elderly, several authors have advocated early monitoring of the

cardiovascular system to optimize resuscitation after injury. Measurements of the base deficit are also thought to be useful in determining the status of the resuscitation.

Assessment

Primary survey (the following specific issues are common in the elderly trauma patient)

1. Airway
 - a. Look for airway anomalies likely to complicate management including dentures and limited mouth opening (temporomandibular arthritis).
 - b. Bag mask ventilation is facilitated with dentures in place.
 - c. Patient with chronic C-spine abnormalities such as diffuse idiopathic skeletal hyperostosis (DISH) should be anticipated to have a difficult airway.
2. Breathing
 - a. Apply supplemental high flow oxygen early given limited respiratory reserve.
 - b. Maintain a low threshold for obtaining an arterial blood gas (ABG).
3. Circulation
 - a. Vital signs may be an unreliable guide in the elderly.
 - b. Baseline hypertension is common, and medications further obscure vital sign measurement.
 - c. Low end-tidal CO₂ or elevated base deficit on ABG may be better predictors of compensated shock in this population. Check ABG.
4. Goal-directed therapy
 - a. Geriatric trauma patients are very sensitive to both hypovolemia and fluid overload. Monitor the geriatric patient fluid status hourly in the ER. Patients requiring significant fluid resuscitation may need invasive monitoring and so should be moved to the intensive care unit (ICU) as soon as possible.
 - b. Avoid high-volume continuous intravenous (IV) fluid therapy in patients who have been appropriately resuscitated.
5. Chronic medications
 - a. Geriatric patients may be on several chronic medications that may affect the trauma work-up, including:
 - b. Beta-blockers may keep heart rate low, even in patients with major hypovolemic shock.
 - c. Screen all geriatric patients for antiplatelet and anticoagulant medications.
 - d. Oral anticoagulants may increase risk of bleeding. Early STAT head computer tomography (CT) may be required in patients at risk for head injury, and rapid reversal may be necessary. (See: Head Injury in Anticoagulated Patient protocol).
 - e. Geriatric patients at risk for fluid overload who are on chronic oral anticoagulants and require reversal may benefit from Prothrombin Complex Concentrate (PCC) to minimize fluid administration.
6. Exposure

- a. Avoid hypothermia: All IV fluids given are warmed, blood products (except platelets) given on via rapid infuser with active warming. Warm blankets placed on patient and mechanical warming device (Bair Hugger) if time permits.
- 7. Analgesia and sedative medications
 - a. Sedative medication such as benzodiazepine in patients who are not intubated should be used with caution. The combination of these medications with analgesic drugs can cause significant respiratory decompensation or worsen delirium. In general, mind-altering medications, such as benzodiazepines, should be minimized or not used in this population.
 - b. Agitated patients should be evaluated for hypoxia, hypoventilation, and shock, before administration of any sedatives.
 - c. Older people are more sensitive to analgesic medication. Recommend initial lower doses to avoid hypotension or respiratory decompensation.

Secondary survey (*the following specific issues are common in the elderly trauma*)

- 1. Neurology
 - a. Repeat neurological examination may be necessary.
 - b. Obtaining an accurate assessment of neurologic function is complicated by reduced sensation of normal aging, and underlying dementia.
- 2. Cervical spine clearance
 - a. When clinically possible, prioritizing the spine clearance in geriatric trauma patients, as early mobilization and head of the bed-up is associated with decreased rate of aspiration and respiratory decompensation. (See: [Cervical Spine Guideline](#))
- 3. Imaging
 - a. Chest and pelvis X-rays should be considered for mild trauma (e.g. falls).
 - b. CT Head for all elderly with closed head injury.
 - c. CT C-Spine (See [Cervical Spine Guideline Adult Age 65-plus Algorithm](#)).
 - d. CT Chest/Abd/Pelvis (See: [Blunt Abdominal Trauma Guideline](#)) with spine reconstruction.
- 4. Laboratory
 - a. Complete Blood Count (CBC), Chemistry (Chem 10), Blood Alcohol Content (BAC), Lactate, Base Deficit, Prothrombin Time (PT), Partial Prothrombin Time (PTT), International Normalized Ratio (INR), Type and Screen, and the following additions:
 - b. Electrocardiogram (ECG)
 - c. Troponin for abnormal ECG or concern for chest injury or cardiac event.
 - d. Creatine Kinase (CK) for suspected rhabdomyolysis.

Specific Injury Patterns

Rib Fractures

Chest wall injuries are a particular problem in the elderly patient population and are not well tolerated. Several studies have demonstrated increased morbidity and mortality for elderly

patients when compared to younger patients with similar injuries. Elderly patients with greater than six rib fractures have increased mortality and risk of nosocomial pneumonia. The presence of three or more rib fractures has been associated with increased mortality and duration of ICU and hospital care. Underlying pulmonary contusions may also cause significant pulmonary morbidity and may not become evident until 24 to 48 hours after injury.

The pain associated with rib fractures impairs ventilatory function and increases pulmonary morbidity. Management of these patients is therefore focused on achieving adequate analgesia and clearance of pulmonary secretions. Recent studies have suggested improved outcome with the use of epidural analgesia following rib fractures to obtain adequate pain relief.

It is important to recognize the potential severity of even minimal rib fractures in the elderly population and to have a low threshold for hospitalization, ICU admission, and adoption of an aggressive pain management strategy.

Traumatic brain injury (TBI)

Elderly patients are at increased risk for TBI even following what appears to be a minor mechanism such as a fall from standing. Elderly patients are at higher risk of intracranial hemorrhage with a three-fold higher risk of subdural hematomas when compared to younger patients. A subdural hematoma can result in a gradual neurologic decline that may not be appreciated by the clinician. In addition, the high rate of anticoagulant (coumadin) and anti-platelet agent use in the elderly population can lead to rapid progression of an intracranial hemorrhage once initiated.

Although it is clear that elderly patients with TBI have a higher mortality than the younger population, triage decisions cannot be made based solely on the Glasgow coma score at admission. The Eastern Association for the Surgery of Trauma (EAST) guidelines recommend, “to adopt an initial course of aggressive treatment (with the possible exception of the patient who is moribund upon arrival), followed by a re-evaluation of the patient’s neurologic status at 72 hours post admission. The intensity of the subsequent care provided can then be based on the initial response to therapy.”

Early “aggressive” care should include rapid reversal of anticoagulants including the use of Prothrombin Complex Concentrate (PCC) and transfusions of fresh frozen plasma (FFP) for patients on Coumadin (see Head Injury in Anticoagulated Patients Guideline). Patients presenting with a GCS less than eight will usually require endotracheal intubation for airway protection. As with all TBI patients, resuscitation should seek to avoid episodes of hypoxia and/or hypotension.

Elder abuse

Elder abuse is a term referring to any knowing, intentional, or negligent act by a caregiver or any other person that causes harm or a serious risk of harm to a vulnerable adult. This includes physical, emotional or sexual abuse, exploitation, neglect, or abandonment. The National Center on Elder Abuse (NCEA) suggests one in ten patients over the age of 65 are victims of abuse many of which go unreported. The circumstances surrounding the injury should be examined to detect this often unrecognized situation. Reporting of elder abuse is required for all healthcare professionals.

Use the following information to report abuse:

County	Contact
Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, Yakima	1-800-459-0421 (TTY) 509-568-3086
King, Island, San Juan, Skagit, Snohomish, Whatcom	1-866-221-4909 (TTY) 1-800-977-5456
Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, Wahkiakum	1-877-734-6277 (TTY) 1-800-977-5456
If the person that you suspect is being abused or neglected lives in a nursing home, boarding home, or adult family home call the DSHS Complaint Resolution Unit Number.	1-800-562-6078 (TTY) 1-800-737-7931

Elder abuse additional information:

[Washington Department of Social and Health Services](#); [National Center on Elder Abuse](#)

Disposition

Three or more rib fractures require hospital admission for geriatric patients (fewer if clinically significant pain is present).

Additional reasons for admission:

1. Decreased functional status
2. Poorly controlled pain
3. Concern for elder abuse
4. Determining the cause for injury (syncope, MI, infection, etc.).

Patients with metabolic acidosis or ongoing instability should receive only essential imaging and be admitted rapidly to the ICU.

Consider ICU admission for pelvic fracture in the elderly.

ICU admission required for geriatric patients with three or more rib fractures and:

5. Chronic obstructive pulmonary disease (COPD) or congestive heart failure (CHF) history
6. Significant pain: Consider early epidural analgesia or paravertebral catheter
7. Mental status changes due to acute trauma or chronic disease
8. Pulmonary contusion/laceration or hemothorax/pneumothorax
9. Flail chest.
10. Abnormal oxygenation (Pulmonary Function P/F ratio greater than 300 or clinical judgment) or abnormal ventilation (respiratory acidosis or increased respiratory effort).

Consults

Improved outcomes for the geriatric trauma patients occur with proactive efforts to obtain a geriatric consult with a geriatrician or multidisciplinary team with geriatric experience. Geriatric consultation with a comprehensive geriatric assessment (CGA) are associated with fewer episodes of delirium, fewer falls, decreased likelihood of discharge to a long-term care facility, and a decrease in hospital days.

References

- American College of Surgeons, Committee on Trauma. Extremes of Age: Trauma in the Elderly in Advanced Trauma Life Support, 7th ed., 2004.
- Bar-Or, D., Salottolo, K. M., Orlando, A., Mains, C. W., Bourg, P., & Offner, P. J. (2013). Association Between a Geriatric Trauma Resuscitation Protocol Using Venous Lactate Measurements and Early Trauma Surgeon Involvement and Mortality Risk. *Journal Of The American Geriatrics Society*, 61(8), 1358-1364. doi:10.1111/jgs.12365
- Bonne, S., & Schuerer, D. (n.d.). Trauma in the Older Adult. *Clinics in Geriatric Medicine*, 137-150.
- Bulger EM, Edwards T, Klotz P, Jurkovich GJ. Epidural analgesia improves outcome following multiple rib fractures. *Surgery* 136(2): 426-30, 2004.
- Calland, J., Ingraham, A., Martin, N., Marshall, G., Schulman, C., Stapleton, T., & Barraco, R. (2012). Evaluation and management of geriatric trauma: an Eastern Association for the Surgery of Trauma practice management guideline. *Journal Of Trauma & Acute Care Surgery*, 73(5 Suppl 4), S345-50. doi:10.1097/TA.0b013e318270191f
- Edavettal, M., Rogers, A., Rogers, F., Horst, M., & Leng, W. (2014). Prothrombin complex concentrate accelerates international normalized ratio reversal and diminishes the extension of intracranial hemorrhage in geriatric trauma patients. *American Surgeon*, 80(4), 372-376.
- Harborview Medical Center. Initial evaluation of the geriatric trauma patient guideline. (2014).
- Martin, J., Alkhoury, F., O'Connor, J., Kyriakides, T., & Bonadies, J. (2010). 'Normal' vital signs belie occult hypoperfusion in geriatric trauma patients. *American Surgeon*, 76(1), 65-69.
- National Center on Elder Abuse. <http://www.ncea.aoa.gov> Accessed 7/15/15.
- Washington State Department of Social and Health Services. Report Abuse. <https://www.dshs.wa.gov/altsa/home-and-community-services/reporting-abuse> Accessed 7/6/2015.