Geriatric Trauma: Case Presentation

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Objectives

• Geriatrics?

• Geriatric Trauma Cases

• Current accepted management

• Future?

Please Define Geriatric

• Age: Higher age even in active healthy individual is associated with worse outcome.
  – After age 55 there is a predictable decline in trauma outcomes

• Comorbidity: Medical conditions and Medications

• Frailty: Decreased physiologic reserve across multiple organ systems leading to an impaired ability to withstand physiologic stress
  – Declining life force
Geriatrics: Definition

- While age has to remain part of the definition, few would call patient older than 55 “geriatric”.
- A combination of age, comorbidities, and frailty will provide a much more accurate definition for geriatric trauma.
  - However, a complicated formula will be cumbersome to use.
  - Moreover, it is hard to measure comorbidities or score frailty.
- Most authors continued to use the traditional definition of 65 and older.

Which of the following is the best definition of “Geriatric Trauma”

- Age >55
- Age >65
- Age >80
- Age >55 with major comorbidities, age >65 without
- Age >65 with major comorbidities, age >80 without

Please state how strongly you agree or disagree with the following statements

- Geriatric trauma is an increasing problem.
- Geriatric patients are generally under-triaged to non-trauma centers.
- Geriatric patients are generally over-triaged to trauma centers.
- Outcome of geriatric trauma patients is better in higher level trauma centers versus non-trauma centers.
Case 1: “pain in the Neck”
Real case with modifications

- 89 year-old man with history of ankylosing spondylitis who suffered a ground-level fall after his feet got tangled on the edge of the living room carpet.
- He was awake and alert with normal vital signs and no neuro deficits on arrival.

Spine Injury with Ankylosing Spondylitis or DISH

- Ankylosing spondylitis (AS): chronic inflammatory rheumatic disease that primarily effects the vertebral column and sacroiliac joints.
- Diffuse Idiopathic Skeletal Hyperostosis (DISH): a form of degenerative osteoarthritis which is characterized by unique calcifications along the sides of continuous vertebrae of the spine and calcification of tendons at their bony insertion.
- Over time, these disease process results in extensive remodeling of the spinal axis via ligamentous ossification, vertebral joint fusion, osteoporosis and kyphosis

Prone to Hyperextension
Back to our case

- 89 year-old man with history of ankylosing spondylitis who suffered a ground-level fall after his feet got tangled on the edge of the living room carpet.
- He was awake and alert with normal vital signs and no neuro deficits on arrival.

Treatment AS and DISH

- Minimize movement
- Immobilized in their position of comfort with extra padding added to the back of the head as needed to prevent hyperextension
- C-collar: Probably not
ER Treatment

• CT angio to rule out blunt cerebrovascular injury
• He was taken to the CT scanner for CTA neck, during which time he developed agonal respirations followed by bradycardia and PEA arrest.
• What happened?
• Lessons learned
**Work-up of AS and DISH**

- CT entire spine
- MRI: Spine request and with care
- Not allow hyperextension when positioning the patient for CT/MRI.

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**Case 2: “Just a head bump”**

Real case with modifications

- 72 year-old man with atrial fibrillation on Coumadin who suffered a ground-level fall after he got up from his chair rapidly to chase his grandchild. “Just got dizzy and fell down hit my right side of the head against the table”
- He walked to your ER. He was awake and alert with normal vital signs. He has a headache with a very small scalp hematoma on right, not bleeding.
- Busy day in the ER

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What really happened

- Got admit to treatment room after waiting
- While in treatment room, wife could not wake him up (about an hour)
- Code called, intubated, right pupil not reactive, hypertensive
- CT head obtained
Protocol

- Rapid triage directly to a treatment area.
- Emergent ordering of head computed tomography (CT) scan. This may be prepared by the triage nurse with the signature of a physician. CT tech is notified of need to prioritize this study.
- An initial emergent evaluation by Emergency Physician, Trauma Surgeon, or Neurosurgeon.
- Stat labs with Emergency Hemorrhage Panel (EHP) including prothrombin time and international normalized ratio (INR), and Type and Screen done within 10 minutes of arrival.

Patients with CT scan confirmation of intracranial hemorrhage and INR>1.5

- 10 mg of vitamin K given IV
- Kcentra is a 4-factor Prothrombin Complex Concentrate (PCC) and the preferred treatment/reversal agent in treatment of patients who are anticoagulated with Warfarin and have intracranial hemorrhage.
- Relative contraindications:
  - history of thrombotic or thromboembolic event in past 6 weeks
  - known prothrombotic condition
  - mechanical heart valve such as aortic or mitral valve replacement
INR | Kcentra® Dose | Maximum Dose
---|---|---
1.6-1.9 on warfarin | May consider FFP pathway or Kcentra 25 units/kg | 2500 units
2.0 -3.9 on warfarin | 25 units /kg | 2500 units
4.0-6.0 on warfarin | 35 units /kg | 3500 units
> 6.0 on warfarin | 50 units /kg | 5000 units

Prothrombin Complex Concentrates (PCC)
- 4 factor: II, VII, IX, X
  - Kcentra
  - Standard of care for reversal of Warfarin in most of Europe and Canada
- 3 factor (lack FVII):  
  - Bebulin or Profilnine  
  - With FFP for reversal of Warfarin
- Small volume
- Rapid reversal of INR
- Virus inactivated
- Not associated with TRALI

Reversal Options

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<th>Vitamin K</th>
<th>Plasma</th>
<th>PCC</th>
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<tr>
<td>Time to Reversal</td>
<td>12-24 hr</td>
<td>3 hr</td>
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<td>Duration</td>
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<tr>
<td>Volume</td>
<td>1 mL</td>
<td>1.5 - 2.0 L</td>
</tr>
<tr>
<td>Effect on very hi INR</td>
<td>Good</td>
<td>Moderate</td>
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Case 3: “I love to clean my gutters”
Real case with modifications

• 75 year-old man with history of HTN and diabetes who fell from the ladder on his left side while he was cleaning his gutters.
• He was awake and alert with normal vital signs and no neuro deficits on arrival.
• He complained of his left chest pain.
• He had decreased breath sounds with subq air on left.
A GERIATRIC SPECIFIC RIB FRACTURE PROTOCOL SIGNIFICANTLY IMPROVES MORTALITY

Sean F. Monaghan MD, Charles A. Adams* MD, Michael D. Connolly MD, Andrew H. Stephen MD, Stephanie N. Luecke MD, David T. Harrington* MD, William G. Cioffi* MD, Daithi S. Heffernan MD
Brown University Rhode Island Hospital

- Immediate ICU admission for every geriatric patient whose injuries included at least 2 rib fractures
- Multidisciplinary analgesics including epidural analgesia and frequent pulmonary toilet.
A GERIATRIC SPECIFIC RIB FRACTURE PROTOCOL SIGNIFICANTLY IMPROVES MORTALITY

- With the aging trauma population it is critical that we understand the unique burden minor trauma imposes upon an often fragile physiology.

- We noted that using an aggressive standardized protocol with a large emphasis on prophylactic pain control, pulmonary toilet and a willingness to utilize scarce resources, resulted in significantly lowering the mortality associated with rib fractures.

Multidisciplinary pain Management is important

ANALGESIA AND SEDATIVE MEDICATION

- 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.

- Older people are more sensitive to analgesic medication. Recommend initial lower doses to avoid hypotension or respiratory decompensation.
Delirium in the ICU

- Patients with a single episode of delirium had a 40% increase in ICU and total hospital costs, after controlling for confounding variables
  - increased risk of mortality
  - Dementia a risk factor
- Prevalence of delirium was 73% in the surgical ICU and 67% in the trauma ICU. Pandharipande et al. 2008. J Trauma 65:34-41

What is the strongest independent risk factor for delirium?

- Sedative Medication: Benzodiazepine (such as midazolam or lorazepam)

Nightmares After the I.C.U.

Researchers have begun to identify the I.C.U. treatment that has led to the most harrowing flashbacks: sedation.

Many sedatives contribute to the patient’s delirium and intense hallucinations, which can return, unbidden, for years

The New York Times
So what should I do?

- Treated pain first, especially using non-opioids
  - Tylenol
  - NSAIDS
  - Regional Anesthesia
  - Gabapentin (Neurontin)

Pain Management and Rib Fractures

- Rib fractures were identified in more than 10% of patients admitted after trauma.
- The elderly are more susceptible to rib fractures in low-speed and medium-speed crashes. Shimamura et al. Stapp Car Crash J 47:349-365.
- 65 years of age or older with rib fractures: More fractures much higher mortality. Burge et al. 2000, J. Trauma
- Pain Management and Respiratory Therapy is the Key

Epidural Analgesia

- The main advantage of epidural analgesia over narcotics is that it is non-sedating
- The Eastern Association for the Surgery of Trauma state that epidural analgesia is the optimal modality.
- Several studies including two from Washington
Case 4: “We are waiting for the work-up to finish”
Real case with modifications

- 78 year-old man with history of HTN who was in a motor vehicle crash. He is intubated, backboard, 2 liters IVF, and “stable” vital signs
- He had CT head, chest, abdomen and pelvis
- He has right rib fractures with no hemo-pneumothorax and right femur fracture based on physical exam
- His BP 110/90, HR 85, Hct 31
- ABG 7.35/28/190

Vital Signs in the Geriatric Population

- Vital sign measurements are less reliable for hemodynamic assessment.
- Normal vital signs may signify compensated shock in the elderly due to baseline hypertension.
- Beta-Blockers and Heart rate.
- Low end-tidal CO2 or elevated base deficit on ABG may be better predictors of compensated shock in this population. Check ABG.
GOAL DIRECTED THERAPY

• Goal directed therapy with appropriate early resuscitation and early cessation of fluids is essential.
• Patients requiring significant fluid resuscitation may need invasive monitoring and so should be moved to the ICU as soon as possible.
• Avoid high volume continuous IV fluid therapy in patients who have been appropriately resuscitated.

Future Directions

• Geriatric pre-hospital guidelines
• Geriatric Protocols and guidelines
• Special Centers?
• Modified Rehab-SNF Centers?
• Do You have any conflict of interest?
• Yes, I am getting old

Thank You