Geriatric Trauma:
Case Presentation

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Objectives

• Geriatrics?
• Geriatric Trauma Case Discussion
• Current accepted management

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”

Trauma and Burn Team
Case 1: “I feel dizzy”
Real case with modifications

- 92 year old male with two day history of fevers, chills, malaise and back pain who presented to urgent care. While he was at the front desk, he became dizzy and had a ground level fall. His SBP was <90. He had a CXR that demonstrated multiple rib fractures and a possible loculated pneumothorax. He was brought to HMC and was a full trauma given his hypotension.

Case 1: “I feel dizzy”
Continue

- Dr. Who?
- Seriously; DNR and DNI
- Take a good care of my cadaver; it is donated to the medical school
- Do all other things that are indicated, I still want to live, but do not go crazy.
• Left rib fractures second through seventh.
• Left hemopneumothorax with moderate air and small blood component.
• No contusion
• Right fourth through eighth acute minimally displaced fractures.
• Prominent bleb at the right lateral lung near the rib fractures.

T3 two column fracture, most likely flexion distraction injury as described above.
How do you think a 92 yo is going to do in this CTO brace?

Management

• Antibiotics
• Geriatrics
• Epidural anesthesia
• PT/OT
• No sedation, no Benadryl, minimal narcotic
• Start home medication early
• Discharge?

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

July 22, 2013
So what should I do?

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

Case 2: “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 if 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.

How would you stabilize the neck?

- a) Traditional backboard with rigid cervical collar
- b) Sitting up with cervical collar
- c) Immobilized in their position of comfort with extra padding added to the back of the head as needed to prevent hyperextension
- d) Do not immobilize
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

Work-up?

a) Physical exam is sufficient
b) X-ray of c-spine only
c) CT of c-spine
d) Directly go to MRI of spine
### 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

### Wok-up of AS and DISH

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

### Case 3: “Just a head bump”

- 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
### What Should you do?

- **a)** Patient is stable doing well, he should wait for his turn
- **b)** Check him in now, admit him to treatment room, and put his chart for routine exam
- **c)** Admit him immediately, inform ER physician, order Stat head CT and labs, including INR
- **d)** Activate a full trauma code

### 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
You do not have neurosurgeon immediately available and trauma Level 1 center is 30 minutes away. You start transfer process. What should you do now?

a) Hyperventilate to keep PCO2 below 30
b) Avoid hypoventilation and keep PCO2 around 33-37 range
c) Consider Mannitol but avoid hypotension
d) Do b) and C)

His INR is 4.1. The transfer is going to happen in 10-15 minutes. What do you do next?

a) Start thawing FFP and Give 2U Universal donor FFP
b) Give PRBC
c) Give 35 units of Kcentra (Prothrombin Complex Concentrate)

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

<table>
<thead>
<tr>
<th>INR</th>
<th>Kcentra® Dose</th>
<th>Maximum Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6-1.9 on warfarin</td>
<td>May consider FFP pathway or Kcentra 25 units/kg</td>
<td>2500 units</td>
</tr>
<tr>
<td>2.0 -3.9 on warfarin</td>
<td>25 units /kg</td>
<td>2500 units</td>
</tr>
<tr>
<td>4.0-6.0 on warfarin</td>
<td>35 units /kg</td>
<td>3500 units</td>
</tr>
<tr>
<td>&gt; 6.0 on warfarin</td>
<td>50 units /kg</td>
<td>5000 units</td>
</tr>
</tbody>
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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

<table>
<thead>
<tr>
<th>Vitamin K</th>
<th>Plasma</th>
<th>PCC</th>
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</thead>
<tbody>
<tr>
<td>Time to Reversal</td>
<td>12-24 hr</td>
<td>3 hr</td>
</tr>
<tr>
<td>Duration</td>
<td>Days</td>
<td>24 hr</td>
</tr>
<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>
</tr>
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### Case 4: “Let’s put out the fire”

Real case with modifications

- 76 yoM with a history of mitral regurgitation, hypothyroidism, who attempted to stomp out a grass fire when his boots and pants caught fire. This resulted in the patient suffering full thickness burns to bilateral lower legs from ankle to knee.
- The patient suffered no other injuries, endorses no other problems.
- Healthy, walks everywhere, completely independent
- Excision and graft, complicated.
After 3 trips to OR he develops non-sustained short runs of VT that is increasing in frequency

- The patient had non-sustained ventricular tachycardia and frequent premature ventricular contractions
- Severe mitral valve regurgitation. The patient has myxomatous mitral valve with bileaflet prolapse with moderate-to-severe mitral valve regurgitation.
- Abnormal stress test.
After 3 weeks develops

- Delirium
- Not understanding speech
- Very confused
- Cannot follow physical Therapy
- What should we do?
Workup

• Code stroke
• CT and MRI
• EEG
• Blood gas and labs
• No signs of stroke or seizure, no lab abnormality
• What should we do now?

Follow Everything

• Thyroid Hormone normal
• No sedative, no Reglan, minimal narcotic
• Sleep cycle
• Not better
• Next step?
• We thought no medication but ....

Options

• Should we have done amputation early?
• Prognosis?
• Slowly declining?
• Goals of Care?
Summary

• Geriatric pre-hospital guidelines
• Geriatric in-hospital Protocols and guidelines
• Pain management
• Early discussions about goals of care
  • Palliative care team
• Do You have any conflict of interest?
• Yes, I am getting old

Thank You