TRAUMA IN THE ELDERLY PATIENT

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Issues in Trauma in the Elderly Patient

- What are the mechanisms of trauma in the elder patient?
- Are the injuries in elder patients different than in younger patients?
- What, if any, different diagnostic approach should we take?
- How do our therapeutic options differ in these patients?

General Information

- Elderly account for only 10-12% of all trauma victims
- Consume 25% of trauma-related health care resources
- Higher mortality rates
- Higher complication rates

Definitions

- Elderly = Over age 65 years
- Young old = 65-80 years
- Old old = Over age 80 years
- ATLS recommendations
  - All traumatized patients over age 55 should be considered for evaluation in a trauma center
  - Physiologic age more important than chronologic age in approaching patients

Demographics (population in millions)

- Kathleen Casey-Kirschling, the nation's first baby boomer (born Jan 1, 1946 at 12:01 am)
- 80 million will qualify for social security in next 22 years
  - That's 365 per hour!
Demographics and Trauma

- 1995
  - 10% of all trauma victims were over age 65 years
  - 28% of all injury fatalities were in the elderly patient population
- 2050
  - 40% of all trauma victims will be over age 65 years
  - Fatalities....???

Aging and Trauma

- Cardiovascular
  - Less cardiovascular reserve
  - Respond to hypovolemia with increased SVR vs. increased CO
  - Unable to tolerate and respond to fluctuations in blood volume

Aging and Trauma

- Less circulating catecholamines
- Underlying CAD increases risk for myocardial infarction
  - Hypoxia, anemia, hypotension
- Medications affect response to trauma
  - Beta-blockers, calcium channel blockers, diuretics

Aging and Trauma

- Respiratory
  - Lung less compliant
  - VC, FEV1, PaO2 decrease with age
  - Muscles of respiration weaker in the elderly
  - Airway management may be affected by changes with aging
  - Chest wall more rigid and brittle
    - More prone to traumatic injuries

Aging and Trauma

- Central nervous system
  - Dura adherent to inside of skull
  - Brain atrophies
    - More tendency to move inside skull during trauma
    - More likely to develop CNS bleeds
  - Spinal stenosis / DJD complicates evaluation

Aging and Trauma

- Musculoskeletal
  - Osteoporosis
    - More prone to fractures
    - Decreased mobility of joints
    - Spinal column problematic
Aging and Trauma

- Medications
  - Anticoagulants
    - Increased risk of bleeding
  - Cardiac medications
    - Beta- and calcium-channel blockers
      - Affect response to volume loss
  - Diuretics
    - Volume contraction, potassium depletion

Predisposing Factors for Trauma in the Elderly

- Diminished sight
- Problems with gait / coordination
  - Impaired sensation / proprioception
  - Muscle weakness
  - Degenerative joint disease
  - Neuromuscular disorders
  - Dementia
- Diminished hearing

Characteristics of Injury in the Elderly

- More severe response to any given mechanism
- Decreased ability to respond to trauma
- Trauma can trigger / exacerbate pre-existing medical problems
- Patterns of injury differ in the elderly

MECHANISMS OF INJURY

Mechanism of Injury

- What is the most common mechanism of injury in the elderly?
- What is the most common LETHAL mechanism of injury in the elderly?

Mechanism of Injury - Falls

- Most common mechanism
- Accounts for 40% of elderly trauma
- 3.8% of elderly have a significant fall each year
- Ground level falls most common
- Usually occur at home
Mechanism of Injury – Falls

- 25% due to underlying medical problem
- MUST determine cause of fall
  - May be more significant than the fall itself
    - Syncope / near-syncope
    - CVA
    - Hypovolemia (AAA, GIB, dehydration)
    - Medications
    - Elder abuse
    - Alcohol ingestion

Mechanism of Injury - Falls

- Injuries sustained
  - Fractures – 5%
  - Major injuries – 10%
- Peri-injury fatality rate from falls – 12%
  - 50% will die within one year of the fall
    - Other medical conditions
    - Recurrent falls

Mechanism of Injury – Falls

- Head injury – a significant problem
  - 1 in 50 may require neurosurgery
  - Up to 16% will have abnormal CT
    - Contusion – 36%
    - Subdural hematoma – 33%
  - Highest risk – falls on stairs or from height
    - Fall from standing still poses significant risk

Mechanism of Injury – MVA

- Second most common mechanism
- 28-30% of all trauma in the elderly
- Fatality rate – 21%

Mechanism of Injury - MVA

- Accident Characteristics
  - Occur in daytime
  - Close to home
  - At an intersection
  - Usually involve 2 cars
  - Frequently due to syncopal episode
  - Less likely to involve alcohol, excessive speed, reckless driving

Mechanism – Auto vs. Ped

- Third most common mechanism
- Accounts for 9-25% of trauma cases
- Fatality rate
  - 30-55%
  - Most common lethal mechanism
SPECIFIC INJURIES

Spinal Injuries
- Aging predisposes to spinal injury
  - More prone to fall
  - DJD – less spinal mobility
  - Osteoporosis – more likely to fracture
- Most common mechanism is falls
- Requires extreme caution
  - Prehospital, in the ED
  - Low threshold to image spinal axis

Spinal Injuries
- Bony injuries
  - Most commonly occur C1-C3
  - Type II odontoid fracture most common
- Spinal cord injuries
  - Often from hyperextension
  - Central cord syndrome
    - UE >> LE weakness and variable sensory loss
  - Mortality rate 26%

Spinal Injuries
- Thoracic and lumbar spine injuries
  - Compression fractures most common
  - May occur with minimal trauma
  - Common in osteoporotic patients
  - May need admission for pain control

Head Injury
- Most common mechanism is falls
- Types of injuries
  - Cerebral contusions
    - Lower incidence than in younger patients
  - Epidural hematomas rare
    - Dura adheres to inside of skull
  - Subdural hematomas more common with age
    - Stretching of bridging veins
    - Greater movement of atrophied brain in skull
    - More likely to be on anticoagulants

Head Injury
- Assessment difficult
  - History may be difficult to obtain
  - Subtle alterations in baseline mental status difficult to evaluate
  - May mimic dementia
- Low threshold to get head CT
  - Isodense SDH at 7-20 days after injury
  - May need IV contrast
### Head Injury
- High mortality and morbidity
  - Survival to discharge – 21%
  - Favorable outcome – 11%
  - Mortality higher still if patient over age 80

### Chest Injuries
- Chest wall injuries
  - Highly morbid and mortal injuries
  - Predisposing factors
    - Chest wall more rigid
    - Osteoporosis
    - Less pulmonary reserve

### Chest Injuries
- Rib fractures
  - Most common injury
  - More prone to complications
    - Pneumonia, hypoventilation
  - Lap-shoulder belts do not prevent these injuries
    - Actually may CAUSE them
  - Check for rib fractures, sternal fractures, flail chest

### Aortic Injuries
- Little data available
- Suspect if mediastinum > 8 cm
- Upright CXR preferable
- Low threshold to perform chest CT or aortography if injury suspected

### Abdominal Injuries
- Seen in up to 30% of elderly trauma victims
- Abdominal exam unreliable
  - Ultrasound or DPL if hemodynamically unstable
  - CT if hemodynamically stable
- Mortality rate 4-5 times higher than in younger patients

### Extremity Injuries
- Most frequently injured organ system
  - Increased bone fragility
  - Increased risk for falling
- If patient is osteoporotic
  - 30% will sustain a fracture by age 75
### Extremity Injuries Types of Fractures

- **Proximal humerus fractures**
  - Women:men = 2:1
  - 30% of UE fractures
- **Radial head fractures**
  - Most common elbow fracture
  - 15% of UE fractures
- **Distal radius fractures**
  - Most common UE fracture

### Extremity Injuries Types of Fractures

- **Hip fractures**
  - Most common cause of admission in the traumatized elderly patient
  - Early mortality = 5%
  - One year mortality = 13-30%
  - May present subtly
    - Consider bone scan, CT or MRI if patient has persistent hip pain or cannot ambulate

### Extremity Injuries Types of Fractures

- **Ankle fractures**
  - 25% of all LE fractures
  - Lateral malleolus fractures most common
- **Pelvic fractures**
  - Single ramus fractures - fall from standing
  - Major pelvic fractures highly morbid
    - Stable, closed fractures
      - 16% mortality
    - Unstable or open fractures
      - Up to 80% mortality
    - Overall mortality – 11%

### Soft Tissue Injuries

- **Skin trauma**
  - Very common
  - Difficult to repair
    - Consider steri-strips vs. sutures
    - Consider treating like burns
  - More tetanus-prone
    - Low threshold for prophylaxis
      - Passive and active

### Burns

- **HIGH mortality rate**
  - Rate – age plus % BSA burned
  - High complication rates
  - Often cooking-related
  - Low threshold to admit

### Management of the Elderly Trauma Patient

- **Prehospital**
  - Rapid transportation
  - Low threshold to send to trauma center
  - Information from witnesses / prehospital personnel is key
- **Prehospital and ED management**
  - Patient must be watched closely for rapid deterioration
Management of the Elderly Trauma Patient

- Airway / breathing
  - All patients need supplemental oxygen
  - Airway management may be difficult
    - BVM – cachexia, edentulous
    - Intubation
      - Decreased mouth opening
      - Decreased neck mobility
      - RSI drug choices may be limited by preexisting medical conditions

- Circulation / resuscitation
  - Fluid / blood resuscitation may be complicated by preexisting medical conditions
  - Medications alter response to resuscitation
  - Blood should be used if hematocrit drops below 30

Approach to the Elderly Trauma Patient

- History
  - What happened BEFORE the trauma?
    - Fall?
      - Consider syncope, hypovolemia, cardiovascular or cerebrovascular event, alcohol
    - Single car MVA?
      - Consider acute medical event
  - Get medications list
  - Check underlying illnesses

- Exam – vitals
  - Temperature
    - Keep patient warm
    - Use warmed IV fluids
    - Consider following rectal temperatures

- BP
  - May be deceivingly normal
    - Many patient with underlying hypertension
    - Increasing SVR is response to hypovolemia
  - Pulse
    - May be falsely normal
      - Medication effects, decreased catecholeamine response

Approach to the Elderly Trauma Patient

- Laboratory
  - Serial hematocrit or hemoglobins
  - Low threshold to transfuse
  - PT / PTT
  - Serum electrolytes
  - Rapid and formal glucose
  - Medication levels
  - ECG
## Approach to the Elderly Trauma Patient

### Radiographic Studies
- Spine plain films as indicated
- Must get good films, especially odontoid view
- Low threshold to get CT MRI is unable to rule out fractures

### Approach to the Elderly Trauma Patient

### Radiographic Studies
- CXR
- Carefully assess for rib fractures, hemothorax, pneumothorax, pulmonary contusion
- Carefully assess the mediastinum
- Low threshold to get additional studies
  - Chest CT
  - Echocardiography
  - Aortography

### Approach to the Elderly Trauma Patient

### Radiographic Studies
- Abdominal Imaging
  - Ultrasound, CT scanning useful to rule out intraabdominal injury
  - May need admission if suspect hollow viscous injury
- Extremity Imaging
  - Film all areas of concern
  - Hip fractures can be very subtle
  - Consider MRI, CT, bone scan

### Approach to the Elderly Trauma Patient

### Radiographic Studies
- Head CT Scanning
  - Low threshold to order
  - Patients on anticoagulants
  - Complaints of headache, N/V
  - Changes in behavior

### Management of the Elderly Trauma Patient

### Radiographic Studies
- Get consultants involved EARLY
- Low threshold to admit

## Elder Abuse

### Radiographic Studies
- Significantly less common than child abuse
- Many types of elder abuse
  - Psychological abuse
  - Neglect
  - Sexual abuse
  - Physical abuse
  - Financial abuse
### Elder Abuse

**Contributing factors**
- Recent changes in family structure
- Cognitive defects
- Failing physical health
- Financial burdens

**Signs of neglect / abuse**
- Poor hygiene
- Soiled clothing
- Dehydration
- Injuries
  - Look for patterns, injuries of varying ages and severity
  - High suspicion if contributing factors present

### Detection

- Detection requires high index of suspicion
- Required reporting to authorities is required in many states
- Social services intervention is critical – EARLY is best (before abuse occurs)

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**Thank You For Your Attention!**

*Any Questions?*