

TRAUMA IN THE ELDERLY PATIENT

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“All would live long, but none would be old.”

Benjamin Franklin, 1749

The Aging of America



The Aging of America



The Aging of America



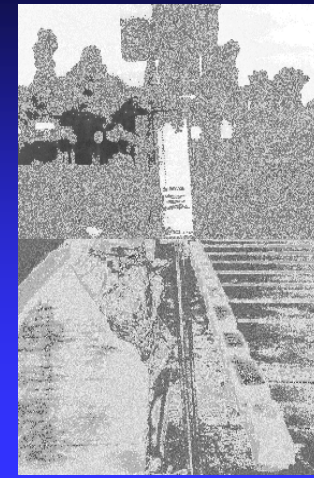
The Aging of America



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The Aging of America



“The tragedy of old age is not that one is old, but that one is young.”

Oscar Wilde, 1891

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?

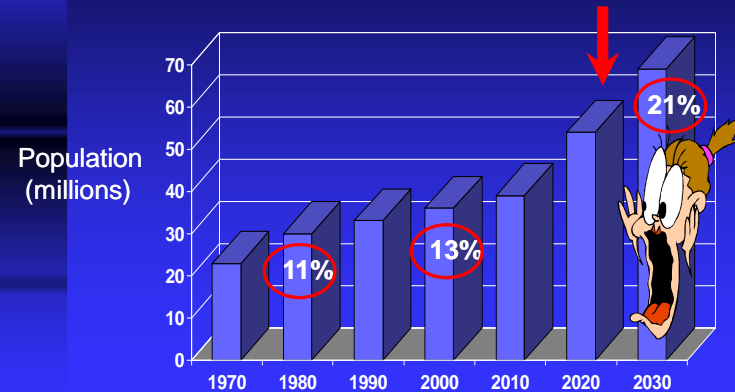
General Information

- 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

The Aging of America



- 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!**



- Guess what Kathleen qualifies for as of Jan 1, 2011?
- **MEDICARE!**
(and the tsunami touches the shore...prepare for the flood)



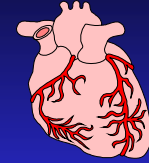
Demographics and Trauma

- 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



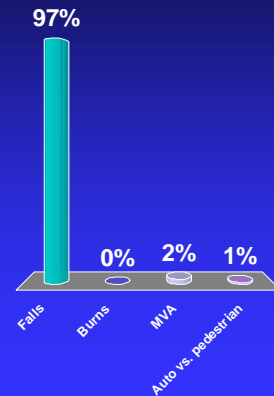
Characteristics of Injury in the Elderly

- 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

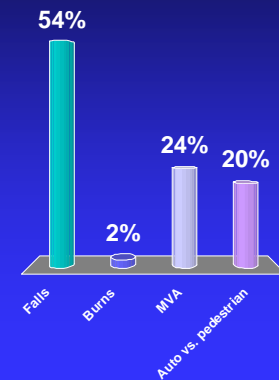
What is the most common mechanism of injury in the elderly?

1. Falls
2. Burns
3. MVA
4. Auto vs. pedestrian



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

1. Falls
2. Burns
3. MVA
4. Auto vs. pedestrian



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
 - May be due to syncopal episode or other medical condition
 - 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%



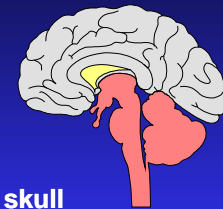
Spinal Injuries

- 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

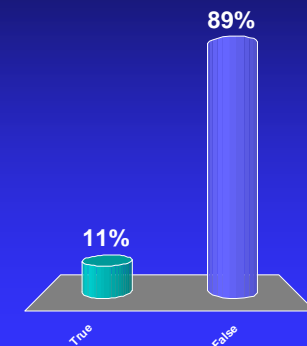
Chest Injuries

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



Seatbelts and airbags prevent rib fractures in the elderly.

1. True
2. False



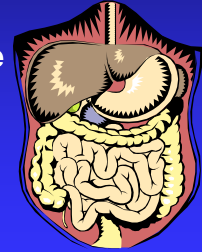
Chest Injuries

- **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



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



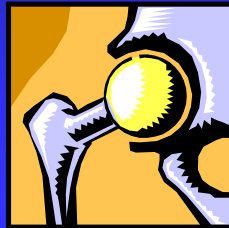
Extremity Injuries Types of Fractures

- 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

Management of the Elderly Trauma Patient

- 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

Approach to the Elderly Trauma Patient

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

Approach to the Elderly Trauma Patient

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



Approach to the Elderly Trauma Patient

- **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

- **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

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



Management of the Elderly Trauma Patient

- Get consultants involved EARLY
- Low threshold to admit

A Couple of Cases

CASE PRESENTATION

CC: "I'm fine"

HPI: 86 year old male brought to PMD's office by his wife fell 10 days ago due to unstable gait; no precipitating medical problem. Hit head on cupboard edge; no loss of consciousness. No headache, N/V. Patient states he feels fine. Wife states he seems more forgetful.

CASE PRESENTATION

PMH: BPH, MI, CABG, HTN, PUD
Meds: Verapamil, prilosec, ECASA
All: NKDA
SH: 2 highballs daily, nonsmoker
Surg: CABG only

CASE PRESENTATION

EXAM

VS: Afeb 170/110 86 18

Gen: WDWN, NAD, wants to go home

HEENT: PERRL, no trauma

Neck: Nontender, FROM

Neuro: Alert, oriented to person, place, year, month but not date. Remembers 2 of 3 objects at 5 minutes. Otherwise normal

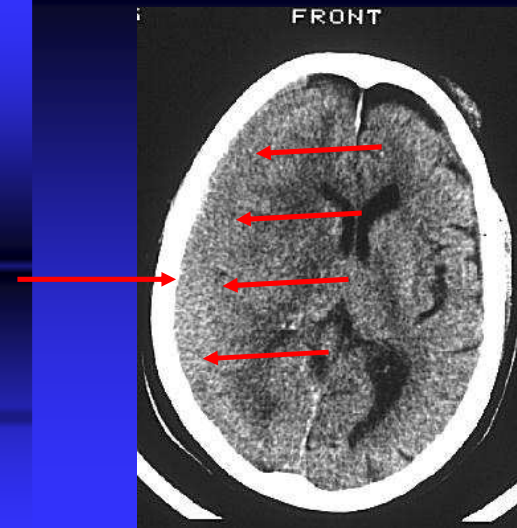
Rest of exam normal

CASE PRESENTATION

PMD office evaluation
Sent home with reassurance

CASE PRESENTATION

Next day wife brings patient to ED
Exam same as previous day
CT scan ordered...



CASE PRESENTATION

Next day wife brings patient to ED

Exam same as previous day

CT scan ordered – large isodense right subdural hematoma with midline shift

Patient has successful neurosurgery, at discharge is back to baseline

CASE PRESENTATION

CC: Right hip pain

HPI: 77 y/o female fell at home, sustaining pain in right hip. No head trauma, no LOC, no N/V. Denies any other injuries.

PMH: DJD

Meds: ASA prn, estrogen

All: NKDA

CASE PRESENTATION

EXAM

VS: 170/100 100 24 Afebrile

Thin, frail elderly female in pain

Total body check normal except pain when moving right hip; no rotation or shortening

CASE PRESENTATION

ED Evaluation

Right hip x-ray normal... BUT...
...Patient unable to weight bear

PMD contacted; after (rather extensive) discussion, patient admitted for pain control and further evaluation

CASE PRESENTATION

Follow-up MRI showed femoral neck fracture; surgically repaired

The patient has an in-hospital "event"...
What have we forgotten to check?

Patient had symptomatic bradycardia in hospital requiring pacemaker placement

CASE PRESENTATION

CC: MVA

HPI: 76 year old female lap and shoulder belted passenger involved in moderate speed t-bone MVA on passenger side. No passenger space intrusion, no broken glass. Air bag deployed. Patient dazed but oriented, complains of chest pain. VS normal in field.

CASE PRESENTATION

PMH: Osteoporosis, hypertension

Meds: HCTZ, estrogen

Surg: None

All: NKDA

Surg: Hysterectomy, appendectomy

Patient placed in hallway room by paramedics

CASE PRESENTATION

EXAM

VS: 100/70 110 28 Afebrile

Gen: Thin well-developed Asian female fully-clothed in spinal precautions, cooperative, oriented, complains of chest pain

Patient's daughter (driver of car, in room next to hallway), sobbing and complaining of back pain

CASE PRESENTATION

ED Course

Initial cursory exam performed (shift change...)

Portable lateral c-spine, pelvis and chest x-rays ordered

Saline lock started; bloods sent

CASE PRESENTATION

You start your shift...nurse calls you to bedside (patient is still in the hallway)

Patient complaining of worsening shortness of breath and chest pain

VS: 130 100/70 36 PO 88%

Patient moved to trauma bay, fully undressed

Paradoxical chest wall motion noted

Large anterior chest wall ecchymosis

Abdomen tender in RUQ

CASE PRESENTATION

ED Course

Type and cross added to labs

Second line started

Pelvis – Right superior/inferior pubic rami fractures, widened SI joint

CXR ...



CASE PRESENTATION

ED Course

Patient intubated for worsening respiratory status

Found to have aortic disruption on CT scan; also liver laceration

Survived surgery; post-op course complicated by MI, CHF

Discharged day 45

“To get old is in the hands of God, but to stay young is a human skill.”

Croatian proverb

***Thank You For Your
Attention!***

Any Questions?