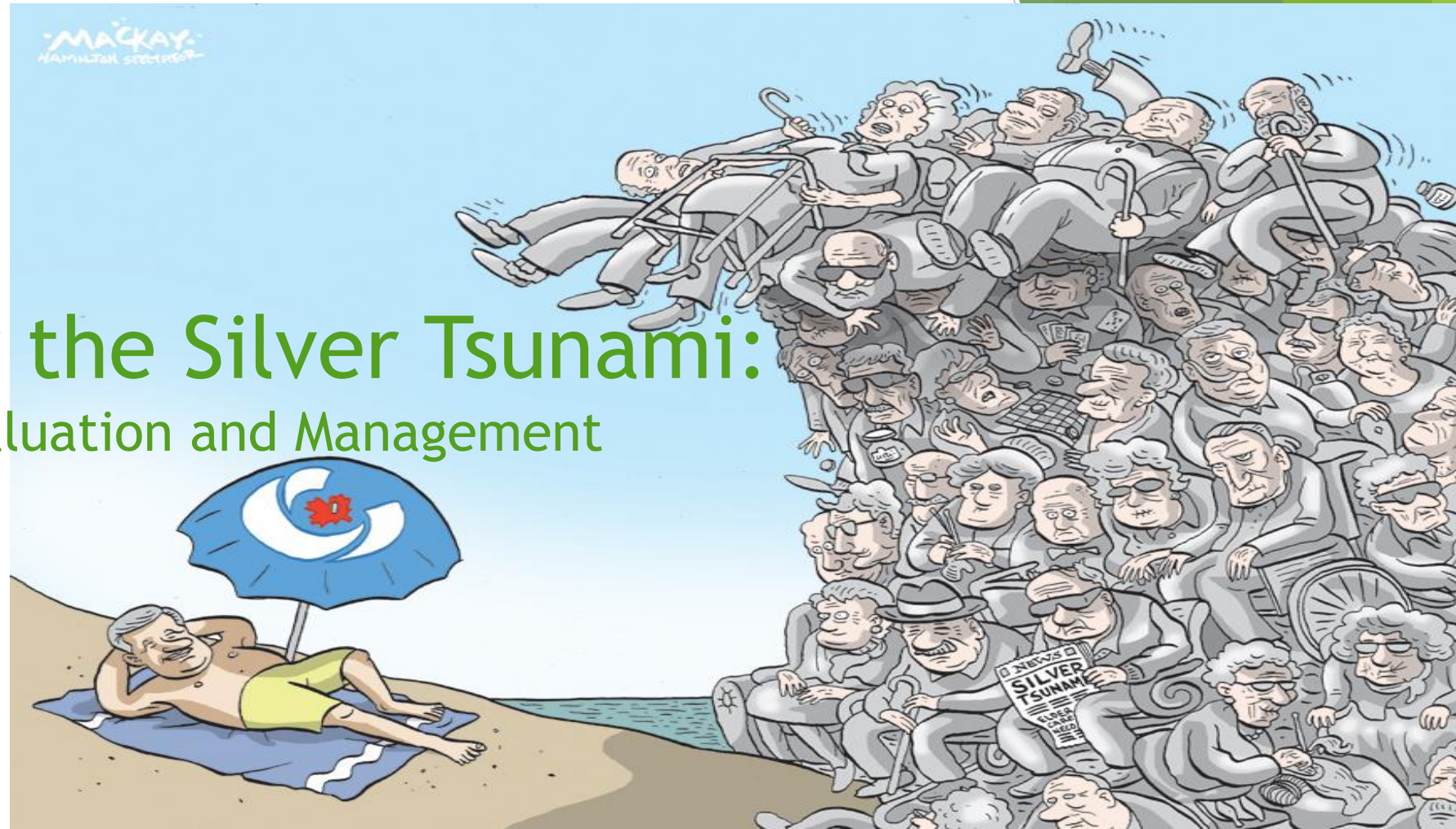


Preparing for the Silver Tsunami:

Geriatric Trauma Evaluation and Management



ROVI ORIGENES MSN NP-C TNS CCRN
APN Trauma Services, TNS Course Coordinator
Advocate Aurora Lutheran General Hospital

Learning Objectives:

- ▶ Identify common mechanisms of injury for the geriatric population
- ▶ Describe the significant implication of physiologic changes of aging to trauma resuscitation principles
- ▶ Discuss current best practice guidelines in the management of geriatric trauma patients

SILVER TSUNAMI

- By the next 25yrs, there will be 72million Americans aged 65yrs or older
 - By 2030, older adults will account for ~20% of the US population
- CDC, 2016



- Life expectancy at 65 years: 19.3years-CDC, 2016

Definition and Demographics

- Age = 65 years old to be “geriatric”
- Age = context of their overall health
- Age = Frailty older trauma patients
- Geriatric Trauma vs Trauma of younger counterpart
- Minor MOI does not mean minor injury
- Geriatric Trauma-7th leading cause of death for this population



Epidemiology and MOI



Epidemiology and MOI

Leading cause of fatal and nonfatal injuries among Geriatric trauma



Epidemiology and MOI



- ▶ most common cause of injury in patients over the age of 65
- ▶ probability of falling at least once in a given year :
 - 27%-40% from home
 - 50% from LTAC
- ▶ fall from standing position
- ▶ benign fall resulting to medical consequences

Fall Risk Factors

- ▶ Medications-antiHTN, diuretics, opioid and sedatives
- ▶ Medical-CV, stroke, syncope, hypovolemia, and hypoglycemia
- ▶ Poor visual ability
- ▶ Poor cognitive ability
- ▶ Poor ambulation-stroke, arthritis
- ▶ Patients who have fallen in the past year are more likely to fall again
- ▶ Most consistent predictors of future falls are clinically detected abnormalities of gait or balance (TUG test)

- ▶ 94F w/ hx DHF, **Afib on coumadin**, mechanical **mitral valve (open repair, remote)**, **AS s/p TAVR three weeks PTA**, **CKDIII**, **Hypothyroid**, good functional status - leaves alone at home, DNR
- ▶ MOI: s/p fall x2 at rehab facility over the past week. Presented to ED with SOB and chest pain. She also endorsed some LE pain, mostly knee. She states that she fell during transfer from chair to bed, on her coccyx. No LOC and no BHT. Mechanical and not syncopal.
- ▶ On presentation CT abdomen was notable for a **left retroperitoneal hematoma measuring 7x5 cm**. MRI spine was notable for **chronic degenerative changes with mild spinal stenosis at L2-3**. CT abdomen was repeated overnight, notable for increasing left retroperitoneal hematoma (8x12x17) displacing her left kidney anteriorly and right gluteal hematoma.
- ▶ Trauma surgery was consulted for evaluation of hematoma. Notably, **her INR on admission was 3.5**, coumadin has been held but INR not reversed, today INR = 2.8. Patient **received a total of 4 PRBC**. Her hemoglobin has been ranging between 6.4 and 8.1 since admission. w/ Hgb down, **INR reversed w/ Vit K**.
- ▶ patient with soft BP but HDS, not on pressors. Developed resp failure.
- ▶ Improved slowly, Coumadin resumed for high risk of VTE events-Hgb stable, eventually tx to ECF

Epidemiology and MOI

2nd most common MOI



MVC

Epidemiology and MOI



- ▶ GT MVC-most common cause of traumatic mortality
- ▶ Average of 500 older adults are injured every day in MVC
- ▶ At age 75, fatal crash rates increase per mile traveled
 - Inc susceptibility to injury and medical complications VS
 - Inc tendency to get into crashes
 - Physical changes that may affect their driving abilities



- ▶ Death at the scene is common
- ▶ Decreased driving abilities-
dec ability to reason and
remember
- ▶ Decline in vision and cognitive
functioning
- ▶ Males w/ higher death rate

- ▶ 40% accounts for all fatalities that occur at crosswalks
- ▶ Risk factors for crosswalk injuries: confusion, vision or hearing deficiency, poor gait
- ▶ GT are 2nd only to children as victims of pedestrian-auto accidents but accounts for the largest fatalities



Early Predictors of Mortality in Geriatric Patients With Trauma

Matthew S Wilson, Sanjit R Konda, Rachel B Seymour, Madhav A Karunakar

Journal of Orthopaedic Trauma 2016, 30 (9): e299-304

- ▶ OBJECTIVE: To identify variables that predict mortality in geriatric patients with trauma.
- ▶ DESIGN: Retrospective review.
- ▶ SETTING: Level I trauma center.
- ▶ PATIENTS/PARTICIPANTS: A total of 147 geriatric patients with trauma (age ≥ 65) with a predicted probability of survival of 10%-75% based on the Trauma Score-Injury Severity Score (TRISS).
- ▶ MAIN OUTCOME MEASUREMENTS: Patients were divided into 2 groups: survivors and nonsurvivors. The following variables available at presentation were analyzed: age, mechanism of injury, temperature, systolic blood pressure, pulse rate, shock index, respiratory rate, Glasgow Coma Scale (GCS) score, base deficit, and hematocrit (HCT). The Injury Severity Score (ISS) and TRISS were calculated for both groups.
- ▶ RESULTS: Of the 147 patients analyzed, 84 (57%) died during index hospitalization and 63 (43%) survived. The mean age of nonsurvivors was significantly higher than that of survivors (78.6 vs. 76.1 years; $P < 0.04$). A greater number of nonsurvivors (72.6%) sustained injuries as a result of a low-energy mechanism compared with survivors (54%; $P = 0.02$). GCS, temperature, and respiratory rate were significantly lower for nonsurvivors, whereas base deficit was higher ($P < 0.05$). The TRISS was predictive of survival (TRISS 0.27 vs. 0.53, $P < 0.001$), but the distinguishing capacity of the TRISS to predict mortality was limited (area under the receiver operator curve, 0.67, 95% confidence interval 0.58-0.76, $P < 0.0001$).
- ▶ CONCLUSIONS: Older age, lower GCS, and a low-energy mechanism of injury are associated with a higher mortality rate in this at-risk geriatric trauma population. Early identification of predictors of mortality may help care providers more accurately assess injury burden in geriatric patients.
- ▶ LEVEL OF EVIDENCE: Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

Older age

Lower GCS

Low energy MOI



- ▶ 83 yo peds vs auto
- ▶ Got out of her car, car on reverse instead of park
- ▶ Car rolled over her leg
- ▶ Extensive soft tissue injury
- ▶ Multiple I&D, plan for closure
- ▶ Ended up BKA

74-year-old obese female presents to the ED as a trauma transfer from an outside hospital. Per outside hospital report, the patient was asleep in her bed earlier this evening when a vehicle drove through her house and threw the patient 10-12 feet. She was found alert and responsive upon EMS's arrival complaining of back and hip pain, wedged between a wall, her mattress., and the car

- 1) Unstable fracture through body of T8 and T7 with abnormal widening of T8-T9 facet joints
- 2) Mild interspinous ligamentous injury at C5-C6 level
- 3) Bilateral superior and inferior pelvic rami fractures
- 4) Right hemothorax
- 5) Concern for esophageal injury
- 6) Pneumomediastinum
- 7) Extraperitoneal bladder rupture and base of bladder
- 8) Bilateral pulmonary emboli secondary to chronic lower extremity DVT (present on arrival)
- 9) Comminuted, mildly displaced left sacral fracture
- 10) Acetabular fracture
- 11) Paraspinal hematoma
- 12) Lt MCA
- 13) Thrombocytopenia-resolved
- 14) HCAP, CAUTI(Serratia)- resolved
- 15) Trach/Gtube



Epidemiology and MOI: Burns



- 13% of all burn unit admission-ELDERLY
- Associated w/ tissue damage-thinning of the skin leads to deeper burn injuries
- Wound healing is slower
- Inc infection rates and recovery time
- TBSA burned >50% = 100% mortality
- Inhalation injuries are poorly tolerated

Retrospective study of a predictive model for elderly burn patients

- ▶ Lethal dose for pt 60-69 yo was 43.1% TBSA burned
for age 70-79yo, 25.9% TBSA
for 80yo and older it was only 13%
- ▶ Any pt w/ 5% burn or more should go to burn center-> 1hand of pt =1%
- ▶ Think during resuscitation in Burn GT- fluid resuscitation/volumes are poorly tolerated due to dec Cardiopulm reserve



- 65 yo M crush and burn injury
- Lt hand got caught in between a plastic sheets roller machine
- Ortho, PRS, Burn center

- ▶ 80 yo F presented with ~46% TBSA burned after nightgown caught on fire while cooking. She burnt areas of her face, neck, anterior/posterior trunk, BUE and BLE.
- ▶ AxO
- ▶ Intubated for airway protection
- ▶ IVF resuscitation
- ▶ Transferred to burn center
- ▶ Family decided comfort care, withdrew care, and pt expired

Lethal dose:

60-69 yo=43% TBSA burned

70-79 yo=25.9% TBSA burned

80 yo=13% TBSA burned



Epidemiology and MOI: Penetrating trauma

- ▶ 4-14% in GT
- ▶ Often self inflicted-firearm vs knife
- ▶ Comparable ISS
- ▶ Inc LOS due to comorbid conditions and complications
- ▶ Mortality rate is comparable



**SUICIDE: MOST COMMON GUN
RELATED DEATHS IN GT**

90 yo M retired officer
-paranoid, sleeping w/ gun under
his pillow
-gun went off and injured him on
the chest-

Injuries: rib fx, pneumothx, pulm
contusion

Mx: stepdown unit, chest tube,
pain control, pulm toileting, O2,
serial CXRs, PT/OT, Npsych cog
eval, Hospitalist consult, Home
safety eval

his wife was sleeping beside him
when it happened



Epidemiology and MOI

Elder neglect and maltreatment

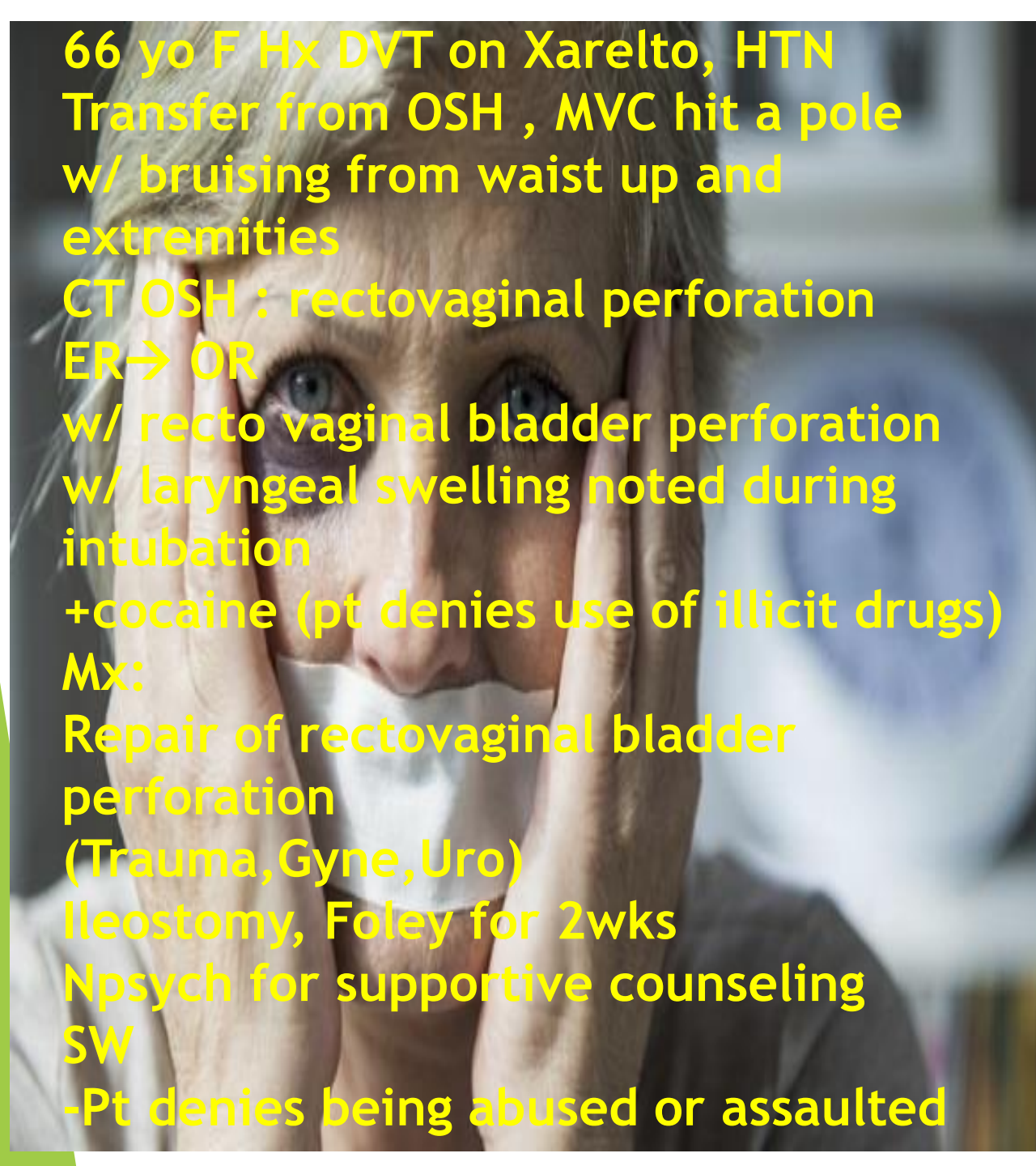
- ▶ 2.5 million suspected cases each yr
- ▶ Less recognized, 85% are unreported
- ▶ Risk factors: family stress, financial strains, inc life expectancy, prolonged life w/ chronic illness



Warning signs of elder neglect

- ▶ Delay in seeking medical attention
- ▶ Inconsistent history
- ▶ Unexplained injuries
- ▶ Discrepancy bet hx and PE
- ▶ Frequent visits for minor trauma
- ▶ Multiple bruises in various stages of healing
- ▶ Poor nutrition and poor personal hygiene





66 yo F Hx DVT on Xarelto, HTN
Transfer from OSH , MVC hit a pole
w/ bruising from waist up and
extremities
CT OSH : rectovaginal perforation
ER→ OR
w/ recto vaginal bladder perforation
w/ laryngeal swelling noted during
intubation
+cocaine (pt denies use of illicit drugs)
Mx:
Repair of rectovaginal bladder
perforation
(Trauma,Gyne,Uro)
Ileostomy, Foley for 2wks
Npsych for supportive counseling
SW
-Pt denies being abused or assaulted

Certain professionals are required by law to report suspected abuse.

Illinois has a law which requires certain professionals to make reports of suspected abuse of adults age 60 or older or people with disabilities age 18-59 who are unable, due to dysfunction, to report for themselves.

This law applies to persons delivering professional services to adults age 60 or older or people with disabilities age 18-59 in the following fields:

- social services
- adult care
- law enforcement
- education
- medicine
- state service to seniors
- social workers

Mandatory reporting requirements only apply when the reporter believes that the adult is not capable of reporting the abuse, neglect, or financial exploitation themselves.

For more information, see the booklet, "Reporting Abuse: What Professionals Need to Know," listed in Publications. For a free copy, contact the IDoA [Senior HelpLine](#).

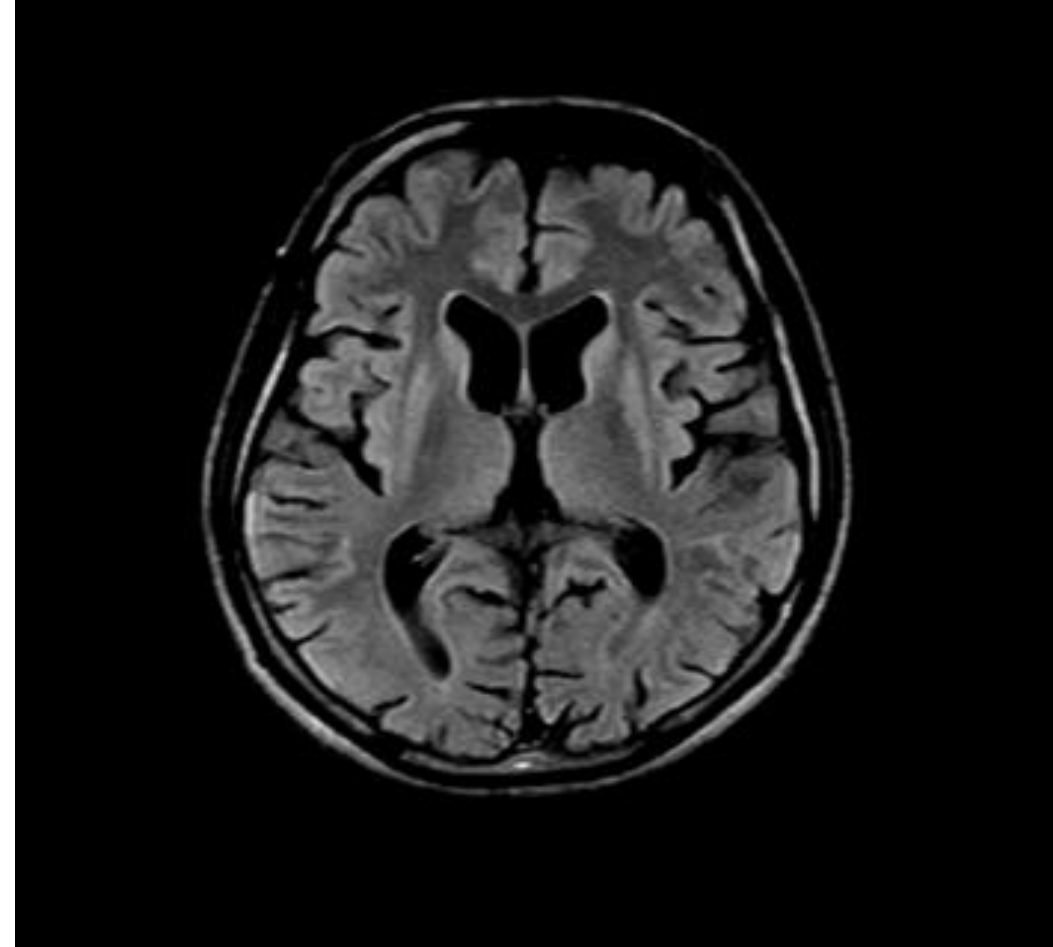
Physiologic Changes in the Elderly



Neuro Physiologic Changes in the Elderly

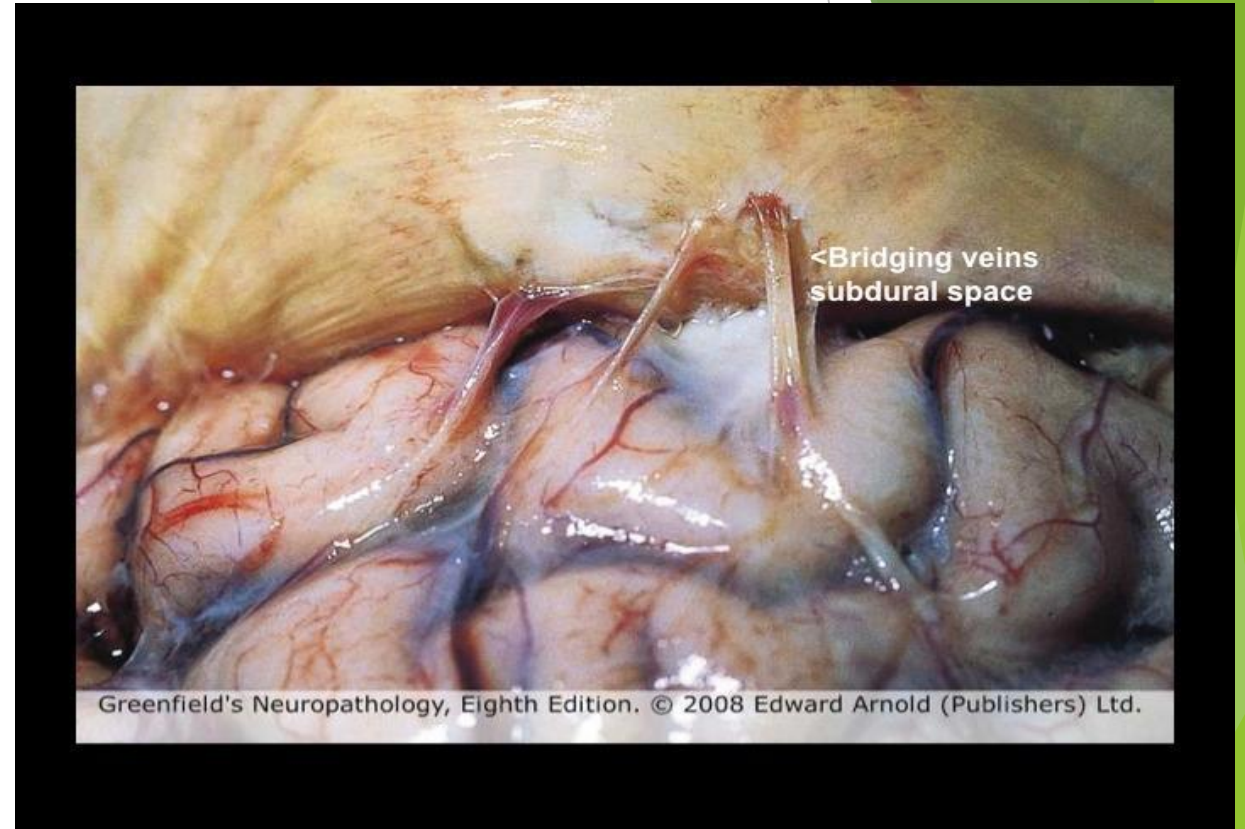
Dec Brain tissue mass

- ▶ Inc movement within cranial vault
- ▶ Inc risk of TBI even w/ minor MOI
- ▶ Inc space for blood to accumulate
- ▶ Poor cerebral autoregulation
- ▶ Poor cerebral perfusion



Bridging veins

- ▶ Dura adheres to the skull
- ▶ Bridging veins are stretched
- ▶ Inc risk for SDH



70 yo and w/ GCS<15 have significant inhospital mortality

- ▶ 88 yo female restrained driver , MVC 20 mph, did not hit her head, up and ambulatory at the scene.

PMHx HTN, ASA 81mg

- ▶ CTH done-> w/ hyperdensity in CTH which showed small SDH
- ▶ Repeat CTH stable
- ▶ Mx AED ppx x7d, PT/OT/ST, Npsych, Hospitalist, PM&R



Delirium in GT

- ▶ D drugs
- ▶ E eyes, ears, other sensory deficits-poor hearing and visions
- ▶ L low O₂(hypoxia, MI, stroke, PE)
- ▶ I Infection
- ▶ R retention of urine and stool
- ▶ I Ictal state
- ▶ U under nutrition or under hydration
- ▶ M metabolic causes (DM, sodium abn)
- ▶ S SDH

Dementia or Delirium?
Confusion?

Decreased senses

- ▶ Smell
- ▶ Vision
- ▶ Taste
- ▶ Peripheral neuropathies
- ▶ Hearing



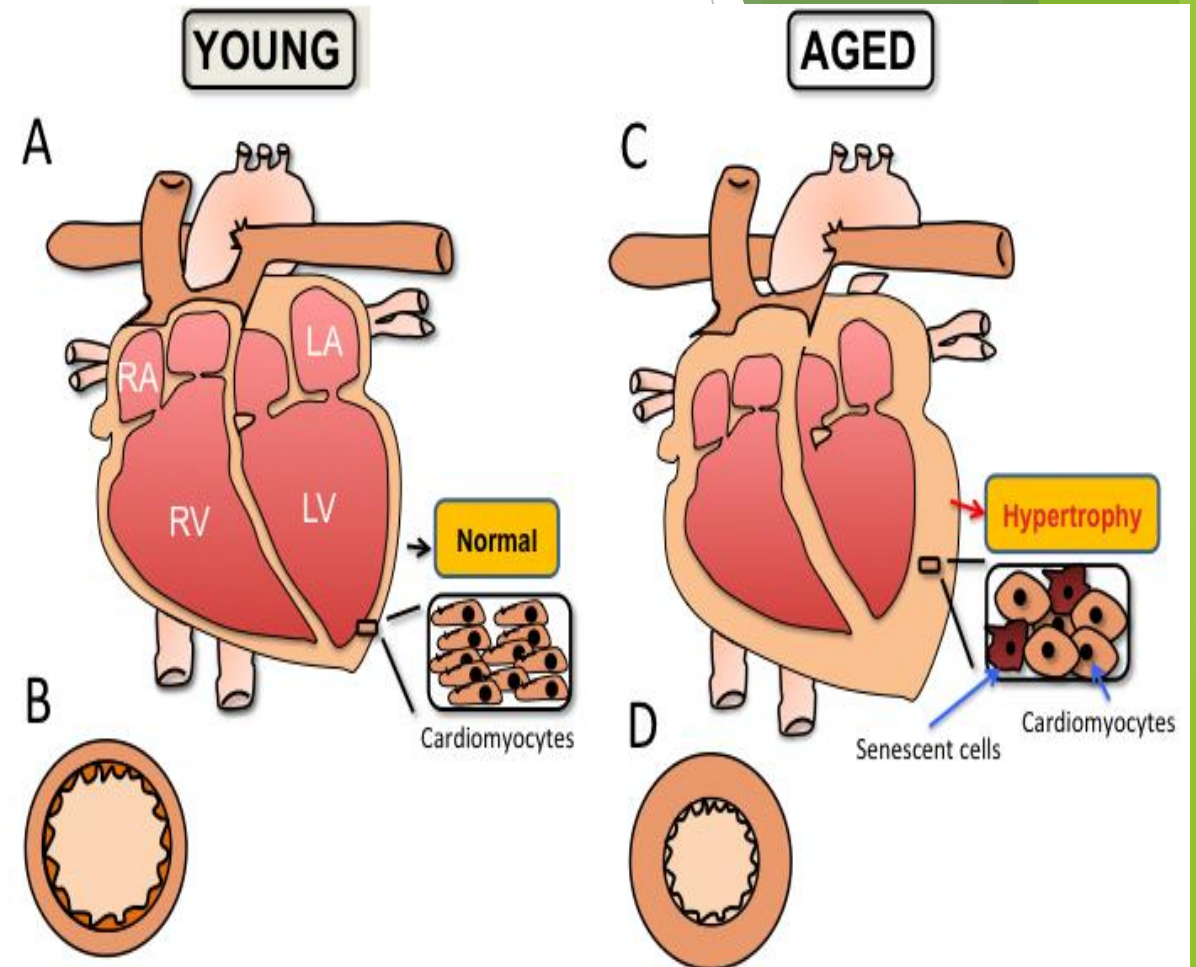
Implications: Neuro changes

- ▶ Impaired mentation? DDx TBI
- ▶ Poorly tolerated head inj from loss of autoregulation
- ▶ AC/antiplatelet +TBI; consider reversal agents
 - FFP, Vit K, PCC
- ▶ Consider long term effects of TBI in the older years



CV Physiologic Changes in the Elderly

- ▶ Myocardial tissue becomes stiff->Dec cardiac stroke->dec SV->dec CO esp dec blood flow to Lower extrem
- ▶ Stiff myocardium also makes pt less sensitive to catecholamines->less profound response to hemorrhagic shock, pain, or anxiety(Absence of tachycardia can give us a sense of security of what really is going on with this pt)



- ▶ Dec CO-> inc SVR->accounts to baseline HTN->may be misinterpreted as norm following a trauma when we are expecting a decline in bp such as in shock
- ▶ The values considered abnormal for VS are different in older adults-



HR >90 and SBP<110 correlate w/ inc mortality in GT

New Trauma triage set point

- ▶ CVD is common (by age 65, 50% of elderly has CAD)-myoc dysfunction impairs the ability to improve cardiac contractility in response to stress and catecholamine surge
- ▶ Conduction abnormalities : Afib
- ▶ Atherosclerotic dx: Diminished peripheral pulses



- ▶ Valves are thickened and fibrous-arterial stiffening is present-> inc workload of heart-> inc afterload



Implications: CV

- ▶ Blunted shock response
- ▶ Risky fluid replacement
- ▶ Reduction of pacemaker cells
- ▶ Less tolerated tachycardia
- ▶ MI incident
- ▶ Less tolerated hypotension



ORIGINAL ARTICLE

FREE PREVIEW

Effect of Aspirin on Cardiovascular Events and Bleeding in the Healthy Elderly

John J. McNeil, M.B., B.S., Ph.D., Rory Wolfe, Ph.D.,
Robyn L. Woods, Ph.D., Andrew M. Tonkin, M.B.,
B.S., M.D., *et al.*, for the ASPREE Investigator Group*

October 18, 2018

N Engl J Med 2018; 379:1509-1518

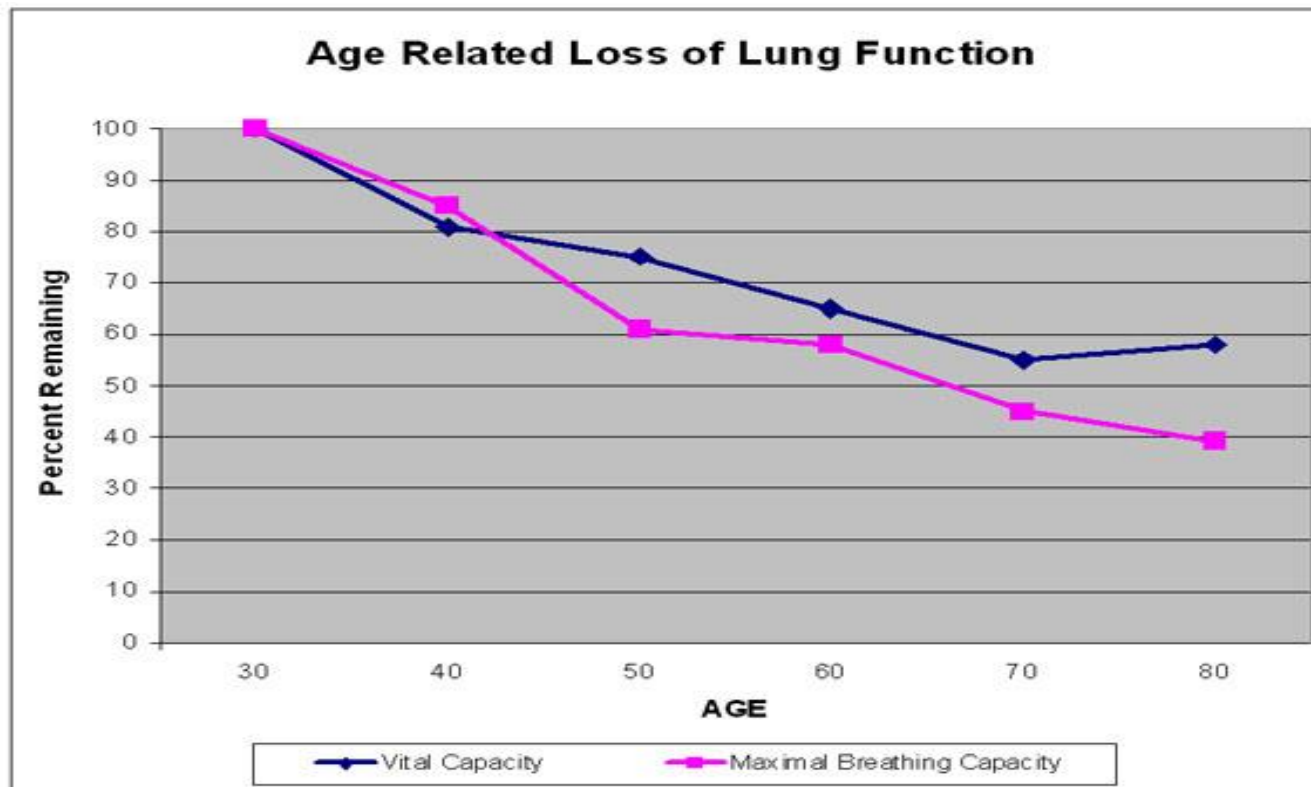
DOI: 10.1056/NEJMoa1805819

CONCLUSIONS The use of low-dose aspirin as a primary prevention strategy in older adults resulted in a significantly higher risk of major hemorrhage and did not result in a significantly lower risk of cardiovascular disease than placebo. (Funded by the National Institute on Aging and others; ASPREE ClinicalTrials.gov number, [NCT01038583](#).)

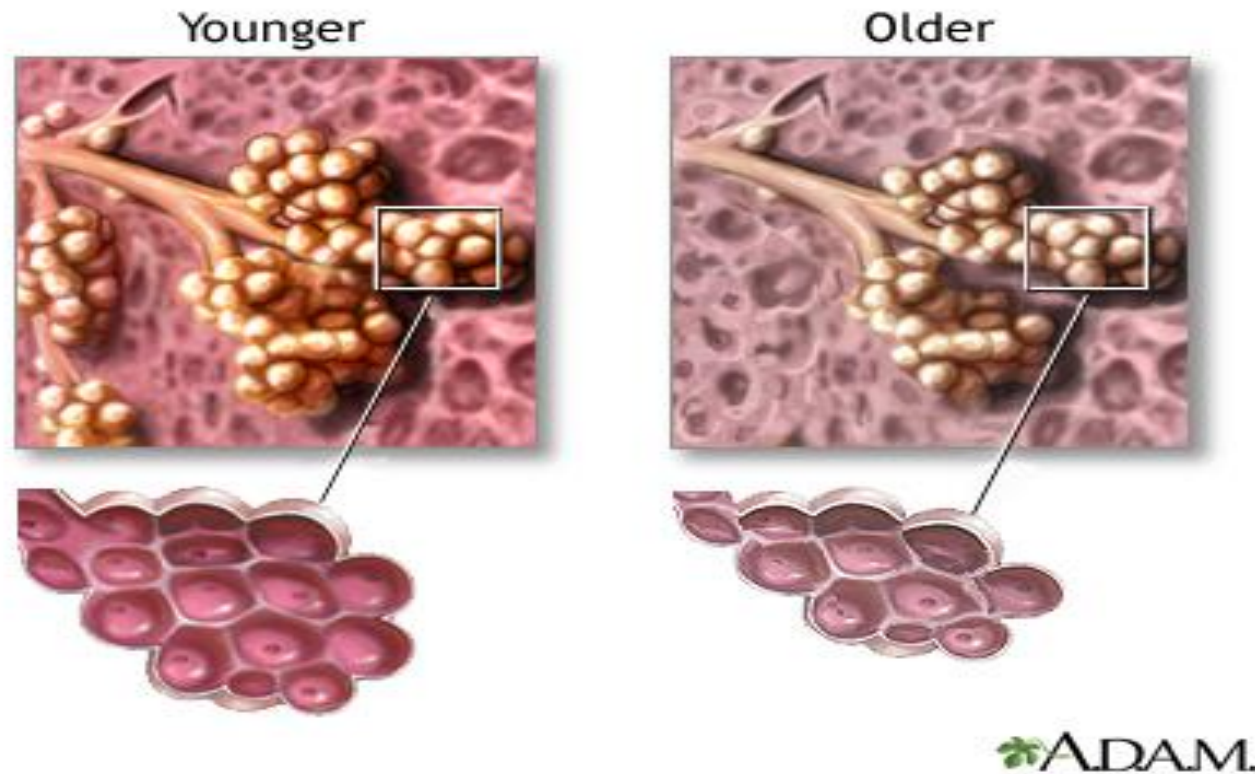
Pulm Physiologic Changes in the Elderly

Have reduced vital capacity, functional residual capacity, and forced expiratory volume

->diminishes respiratory reserve and limits ability to tolerate even minor trauma



Decreased lung capacity, dec chest wall compliance, resp muscle strength, and lung elasticity results in alveolar collapse and decreased arterial oxygenation



Body is less able to compensate for metabolic disturbances

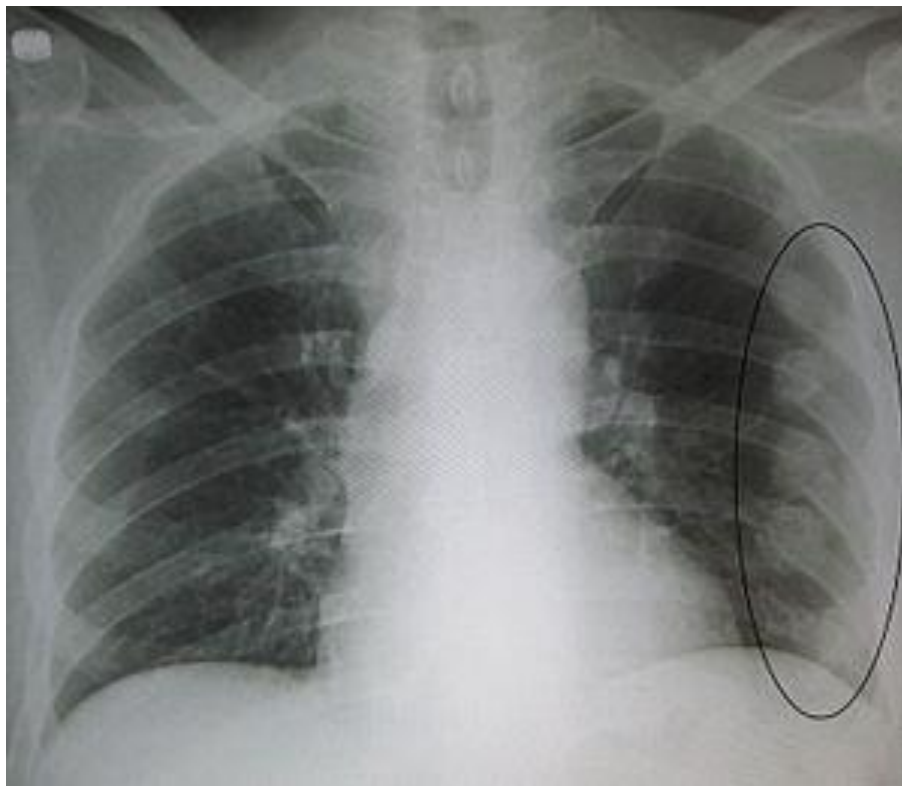
->Responses to hypoxia, hypercarbia, and acidosis are often blunted

->can have normal rr despite hypoxia and hypercarbia

->making clinical assessment challenging

This makes adequate treatment of pain important. Epidural anesthesia, NSAIDs are good options, opioid in titrated doses.





Inj related torso pain can hasten the development of poor inspiratory effort, atelectasis, and PNA

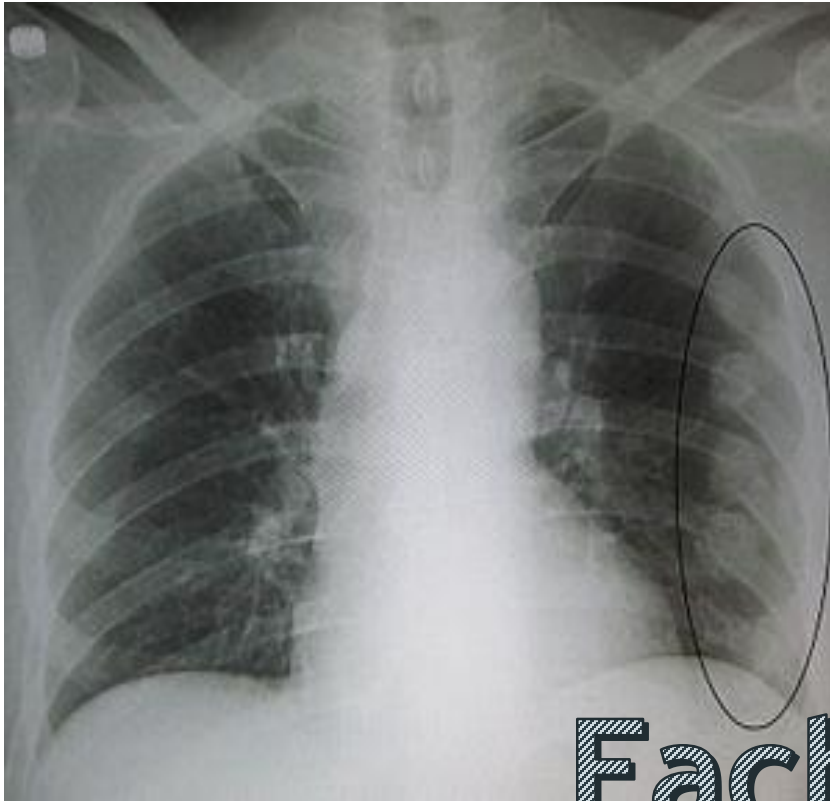
Rib fractures in the elderly

Bulger EM, Arneson MA, Mock CN, Jurkovich GJ
J Trauma. 2000;48(6):1040

CONCLUSION: Elderly patients who sustain blunt chest trauma with rib fxs have twice the mortality and thoracic morbidity of younger patients with similar injuries. For each additional rib fracture in the elderly, mortality increases by 19% and the risk of pneumonia by 27%. As the number of rib fractures increases, there is a significant increase in morbidity and mortality in both groups, but with different patterns for each group. Further prospective study is needed to determine the utility of epidural analgesia in this population.

Harborview Medical Center, Seattle, Washington 98104-2499, USA. ebulger@u.washington.edu

**1 rib fx = 19% inc in mortality
= 27% inc risk of PNA**



Each Rib fx:

Increase mortality by 19%

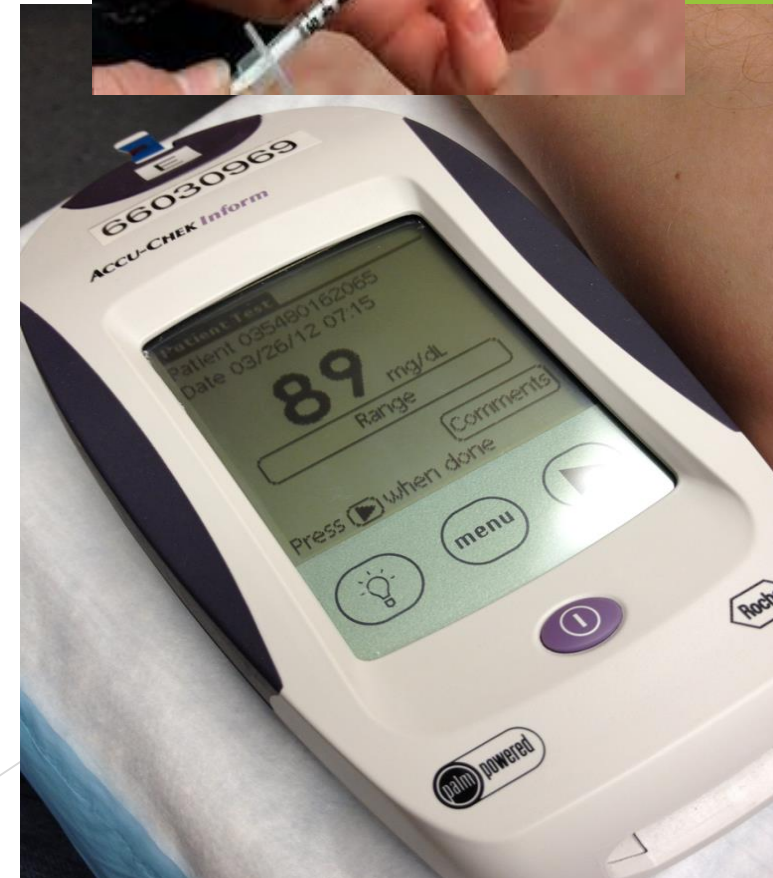
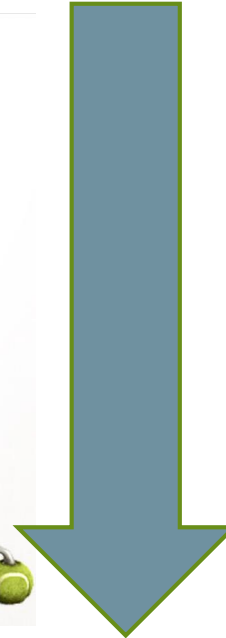
Increase risk for PNA by 27%

Implications: Respiratory

- ▶ Start early and aggressive respiratory care
- ▶ Diminished reserve=Inc risk of resp deterioration
- ▶ Hypoxia and acidosis-> inc work of breathing
- ▶ Reduction in cough and gag reflexes
- ▶ Thoracic GT w/ 2x morbidity and mortality rate vs younger pts
- ▶ Pain control for thoracic injuries-> Epidural than oral, IV, or IM

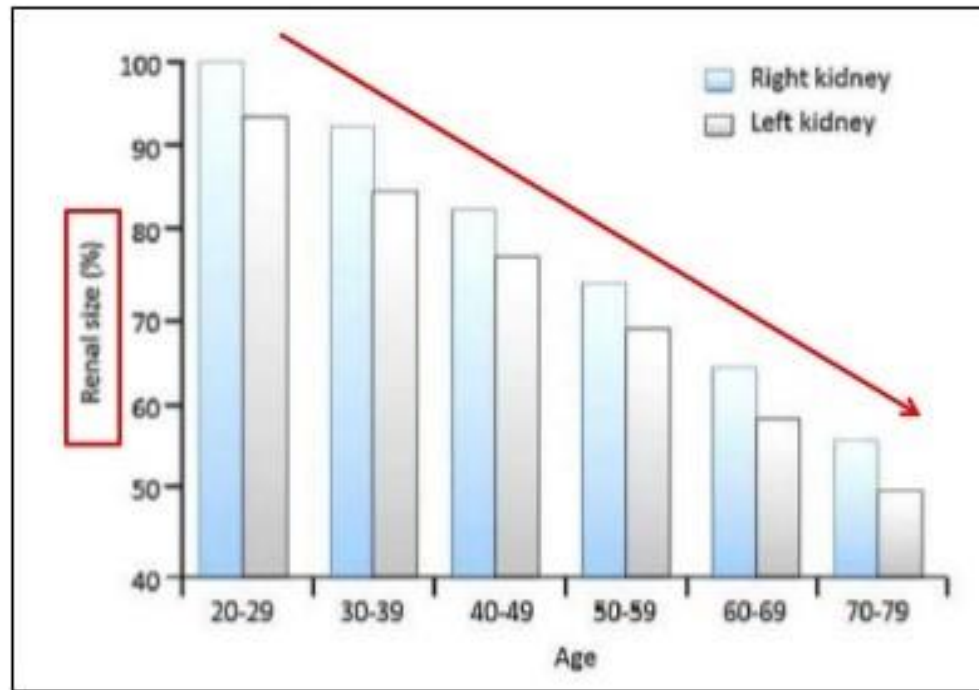
GI/Endo Physiologic Changes in the Elderly

- ▶ Decreased Saliva production, esophageal activity, gastric motility, gastric secretion
- ▶ Decreased nutrient absorption, hepatic drug metabolism
- ▶ Decreased localization to pain
- ▶ Decreased sphincter control
- ▶ Decreased production and sensitivity to insulin
- ▶ Elevated glucose



Renal Physiologic Changes in the Elderly

- Decreased renal cortex , GFR, renal tubule reabsorption
- Decreased lean body mass
- Decreased total body water



www.NephroTubeCNE.com



Implications:

- ▶ More susceptible to hypovolemia
- ▶ Urine output may not inc after volume loading
- ▶ Inability to regulate Na and H ions
- ▶ Acidotic states take longer to correct



**Urine output is not
a reliable endpoint
of resuscitation**

Association between a geriatric trauma resuscitation protocol using venous lactate measurements and early trauma surgeon involvement and mortality risk

David Bar-Or, Kristin M Salottolo, Alessandro Orlando, Charles W Mains, Pamela Bourg, Patrick J Offner

Journal of the American Geriatrics Society 2013, 61 (8): 1358-64

► OBJECTIVES: To investigate whether implementing a geriatric resuscitation protocol that uses lactate-guided therapy with early trauma surgeon involvement is associated with lower mortality through the early recognition of occult hypoperfusion (OH).

► DESIGN: Prospective cohort study.

Lactate guided Geriatric resuscitation

► PARTICIPANTS: All hemodynamically stable individuals with blunt trauma aged 65 and older admitted to the Level I trauma center from October 1, 2008, through December 31, 2011 (n = 1,998).

► MEASUREMENTS: Mortality over time (according to quarter) was analyzed using an adjusted logarithmic regression model stratified according to the presence of OH. OH was defined as lactate of 2.5 mM or greater.

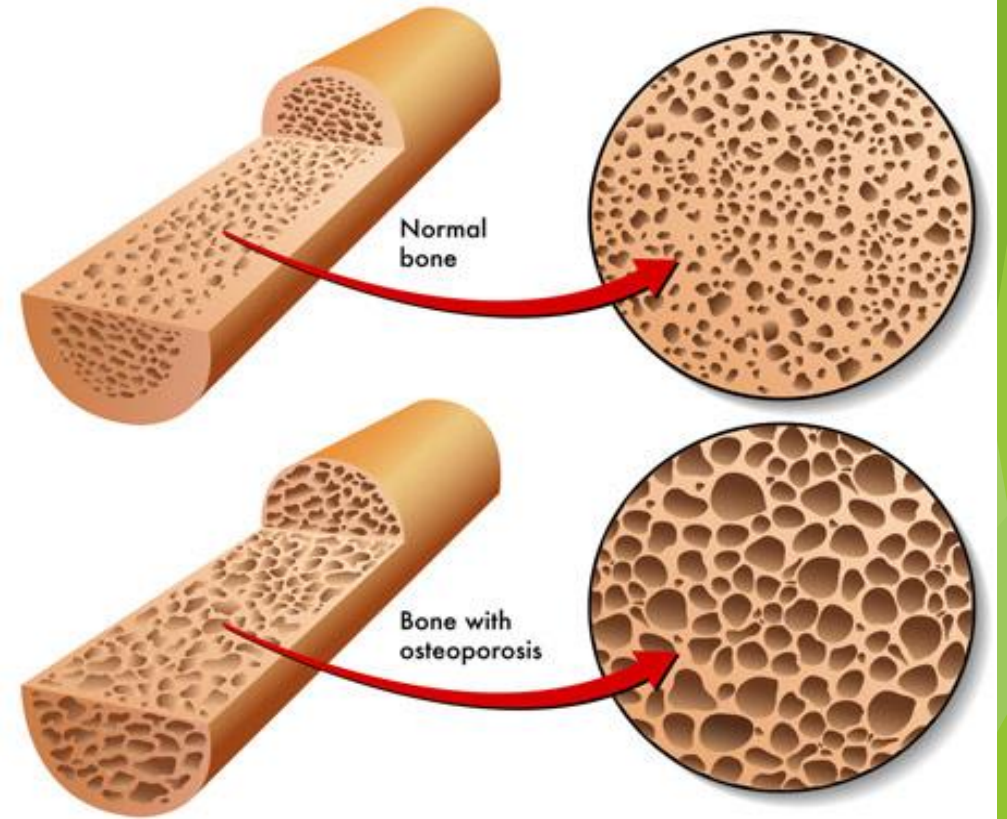
► RESULTS: Overall mortality was 3.9% (n = 78). Admission venous lactate was collected in 73.5% of participants, of whom 20.5% had OH (n = 301). In participants with OH, a significant decrease in mortality was observed over time (adjusted coefficient of determination (R^2) = 0.66, P = .002). A smaller yet significant decrease in mortality rates in participants with normal perfusion status was also observed (adjusted R^2 = 0.55, P = .01).

► CONCLUSION: Early identification and treatment of OH in elderly adults with trauma using venous lactate-guided therapy coupled with early trauma surgeon involvement was associated with significantly lower mortality. A protocol that uses lactate-guided therapy with early trauma surgeon involvement should be followed to improve the care of elderly adults with trauma.

MSK Physiologic Changes in the Elderly

- Decreased height
- Decreased muscle mass
- Decreased bone density
- Decreased strength, agility
- Decreased joint degeneration





66 yo fall from standing at home while getting out of bed, hit the night stand, presented c/o BUE weakness and paresthesia, lower extrem tingling. CTH/CS negative. ED->MRI->to floor->MRI resulted +MRI CS w/ severe deg stenosis on C5 -C6 w/ spinal cord compression/edema-> spinal cord syndrome->Tx to SICU->to keep MAP>80 to prevent spinal shock-> decompression surgery in the next 5-7days

PMHx DM HTN HLD(pt on insulin pump at home w/ known diabetic neuropathy)



Implication

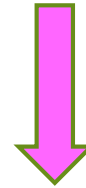
- ▶ Pain control
- ▶ Need for Rehab
- ▶ Discontinuation of spine board ASAP



Physiologic Changes in the Elderly



EYES: Eye disease
Depth perception
Discrimination of colors
Pupillary response

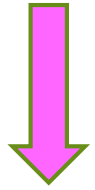


Senses:
Sense of smell and taste
Sense of hearing

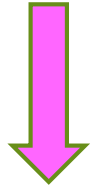


Skin:
Elasticity of skin
Thinning of epidermis
SQ fat





Poor immune system



Thermoregulatory system

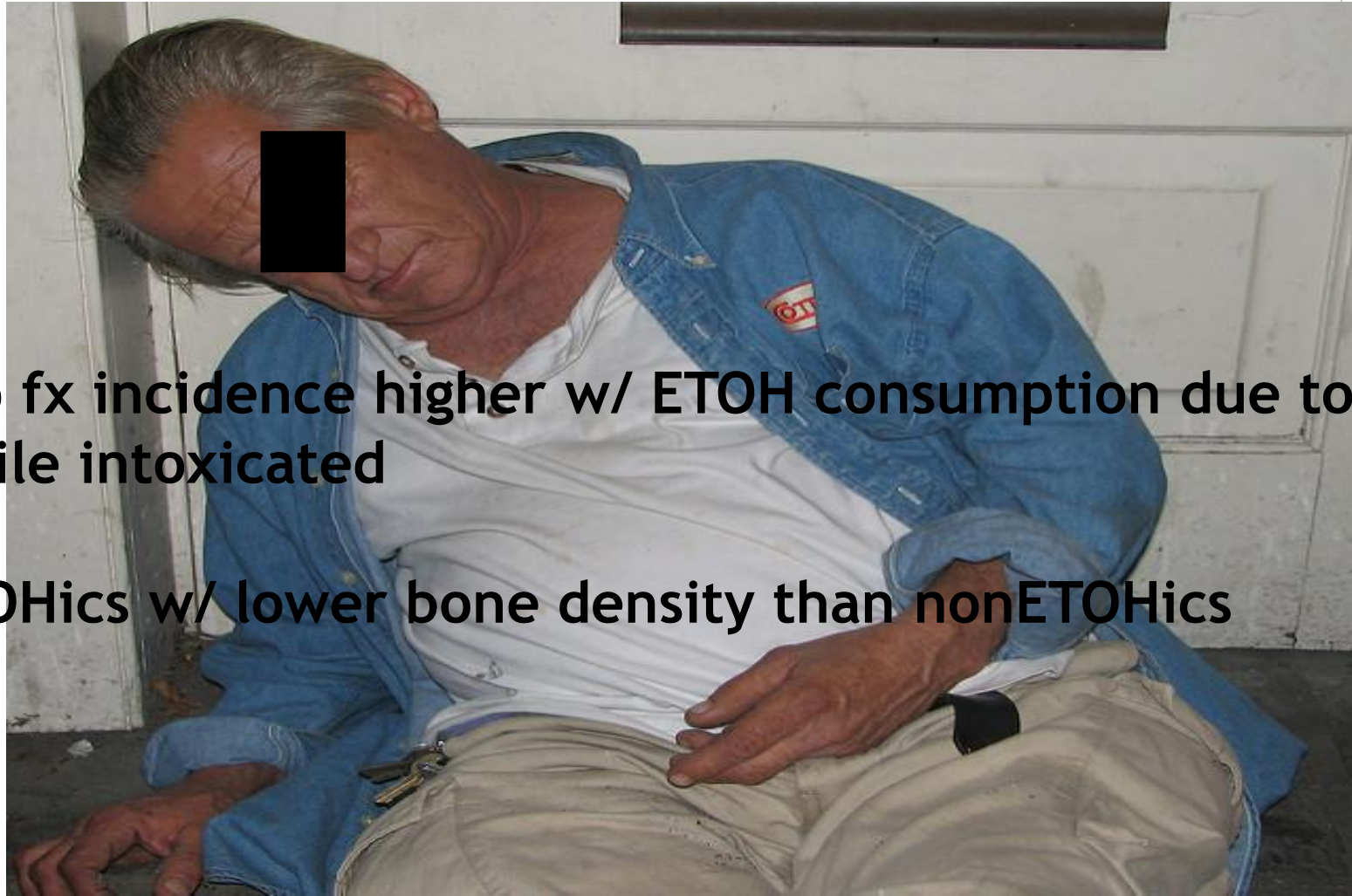


Pre -existing oxidative stress and energy deficit

Alcohol and Drug abuse

- Inc binge drinking
- “At risk drinking” by GT population : 19% M 13% F





Hip fx incidence higher w/ ETOH consumption due to falls while intoxicated

ETOHics w/ lower bone density than nonETOHics

Alcohol and Drug abuse

ETOH-medication interactions inc risk of unfavorable health effects and reducing effects of the medications

ETOH misuse and depressive disorders

Higher BAC



Polypharmacy: Increased risk for drug-drug and drug disease interactions



The junkies preparing their drugs 😊

mematic.net

Anticoagulant/AntiPlt

Betablockers

Ca channel blockers

Steroids

Polypharmacy:

Increased risk for drug-drug and drug disease interactions

29% takes 5 or more Rx medications
42% takes at least 1 or more OTC meds
49% takes 1 or more dietary supplements

Risk factors for polypharmacy:

- **Number and severity of illness**
- **Placement in long term care facilities**
- **Number of physicians involved in care**
- **Number of pharmacies used**

HTN, CAD, Hepatic disease, Renal insufficiency, Cancer, DM, CHF, COPD



Polypharmacy

- ▶ **Susceptibility to polypharmacy:**
 - Incorrect self administration of drugs
 - Omission of drugs
 - Taking another person's Rx
 - Use of OTC meds
 - Med errors by Rx providers



Polypharmacy and Trauma

- ▶ Affects assessment and treatment of trauma pt
- ▶ Anticoagulants, Antiplatelet, CV: BB, antiarrhythmics, and CCB
- ▶ Analgesics, Steroids, eyedrops, psychotropics
- ▶ Decrease renal clearance
- ▶ Medications to be continued as inpt
- ▶ Inpt medications can worsen a comorbid disease

Prevention of Polypharmacy

- ▶ Multidisciplinary conference
- ▶ Education-pt, family, caregivers
- ▶ Medication reconciliation-inpt and outpt
- ▶ Geriatric consultation



- ▶ Follow Beers Criteria in decision making about pharmacotherapy

Axioms and Best Practice Guidelines

Head Trauma

- Older age is an independent risk factor for morbidity and mortality in head trauma patients
- GT patients w/ GCS <9 have at least 80% likelihood of death or disability
- Most head trauma in GT occurs from falls.
- Inc risk of TBI w/ minor MOI w/ 3x higher risk of SDH
- Imaging needed?
- 10% of GT head trauma are taking Coumadin, significant number taking other AC or antiplt.-REVERSE
- Goal: INR <1.6 within 2hrs of admission(TQIP goal INR ≤ 1.4 Plt ≥ 75)
- Monitor

Axioms and Best Practice Guidelines

► Cervical Spine Injury

- Incidence is greater in GT and evaluation is more difficult
- Can result from minor mechanisms such as fall from standing position (Odontoid fx -C2 fx are significantly more common)
- Cervical stenosis, Degenerative RA, OA
- Imaging needed?
- Central cord syndrome

Axioms and Best Practice Guidelines

► Chest trauma

- Rib fractures-most common chest injury; thoracic injury is rare but lethal
- Mortality increases by 19% and risk of PNA by 27% for each rib fracture in patients over the age of 65yo
- Complications: PNA, pulmonary contusion, mortality
- Admission and close observation is indicated w/ even 1 rib fracture
- Imaging needed?

Axioms and Best Practice Guidelines

- ▶ Abdominal trauma
 - Abdominal exam is less reliable in GT
 - Immediate FAST
 - Imaging needed?
 - Risk of contrast induced nephropathy
 - Early surgical consult-Damage control
 - MTP/ Strategies in reversing AC



Axioms and Best Practice Guidelines

► MSK

- Most common type of injury sustained by GT
- Hip fractures are the most common injury requiring hospitalization
- Pelvic fractures are more commonly a lateral compression fracture
- Mortality rate up to 30% from acute or delayed complications of pelvic fx
- GT w/ pelvic fx are hemodynamically unstable until proven otherwise
- Comes w/ associated injuries-assess and evaluate
- Imaging needed?

Figure 10. Lateral Compression Type I Injury



Arrows point to bilateral rami fractures and left sacral fracture.



Axioms and Best Practice Guidelines

► Elder abuse

Evaluate circumstances

Social service referral



Axioms and Best Practice Guidelines :

Criteria for admission specific to GT patient

- ▶ Problem of under triage=2 fold increase in mortality risk of GT

Recommendations:

- ▶ GT to be evaluated at a trauma center w/ trauma team activation regardless of mechanism
- ▶ GT w/ SBP <110 be transported directly to a trauma center for evaluation, HR of 90 be used as the threshold for tachycardia



Considerations:

- ▶ Comorbidities in addition to their injuries
- ▶ Occult injuries and subsequent deterioration
- ▶ Need for aggressive pain control
- ▶ Multiple displaced rib fx and risk of delayed death
- ▶ Lack of support

Axioms and Best Practice Guidelines: Evaluation and management of GT

- ▶ Understand GT physiologic changes
- ▶ History, comorbidities, and non trauma events
 - Secondary survey
 - Decreased pain perception->difficulty localizing to pain->risk of occult injuries



► Airway **B**reathing but w/ close monitoring(including EtCO₂)

- Limited resp reserve->early high flow O₂ and early aggressive airway management
- RSI w/ reduced (20-50%) barbs, benzo and etomidate dosaging; GCS<8 intubate



► Circulation

- Trend vital signs-more useful than individual measurement, look for s/sx of shock
- Assess for hemodynamic state
- Balanced fluid volume resuscitation
- Restrictive transfusion
- Early recognition for MTP need
- Reversal of AC or antiplatelet
- Markers of successful resuscitation
- Early lactate measurement



A photograph of an elderly woman with white hair lying in a hospital bed. She is wearing a patterned hospital gown and has a white identification band on her left wrist. Her expression is one of concern or distress, with her hand near her mouth. The background is dark, and the lighting is focused on her face.

Disability

- Reasons for impaired mentation
- Never assume that confusion and mental status changes are normal age related changes


► Exposure

- Hypothermia
- Abrasions, lacerations, bruising
- Causes of hypothermia
 - impaired thermoregulatory ability
 - decreased fat stores
 - existing chronic conditions



- ▶ **Imagings-Liberal use of CT for blunt injury due to high prevalence of occult injuries**
- ▶ **Imaging should include all CT scans needed to rule out injury in appropriate areas at risk.**



- 
- ▶ Non traumatic events that could complicate GT presentation
 - ACS
 - Hypovolemia due to dehydration
 - UTI
 - PNA
 - Acute renal failure
 - CVA
 - Syncope
 - ▶ Underappreciated hypoperfusion
 - ▶ Lab panel: lactic acid, blood gas, PT/INR, BUN/crea, ETOH level, urine tox, Lytes

- ▶ Pain control and analgesia (Sedation, urinary retention, and nausea)
- ▶ 3 most common GT analgesics
 - NSAIDS
 - Acetaminophen
 - Narcotics

Common complications and Mx

- ▶ Pulmonary insufficiency
 - Chest injuries->chest wall stiffening->dec functional reserve and ineffective cough
 - CDB, IS, Acapella, CPT, Early mobility
 - Early sputum cx
 - Rib stabilizers for multiple rib fx



Common complications and Mx

► Coagulopathy

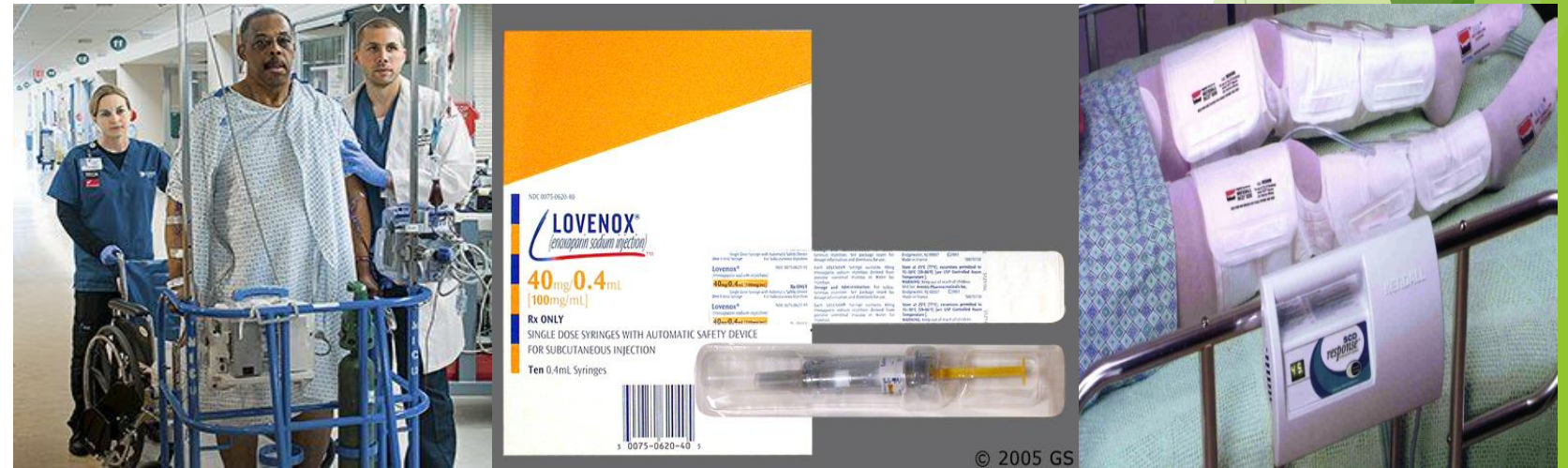
- Rewarm hypothermic pts
- Reverse metabolic acidosis
- Timely reversal of coagulopathy
- Control of bleeding



- TQIP Recommendation: That a rapid anticoagulation reversal protocol be developed in each center based on the availability of products, local costs, and preferences. Use of PCC, Platelet tx or DDAVP, Praxbind

Common complications and Mx

- ▶ VTE
 - Early mobilization
 - SCDs
 - Surveillance Doppler
 - Pharm DVT ppx
 - IVCF



Common complications and Mx

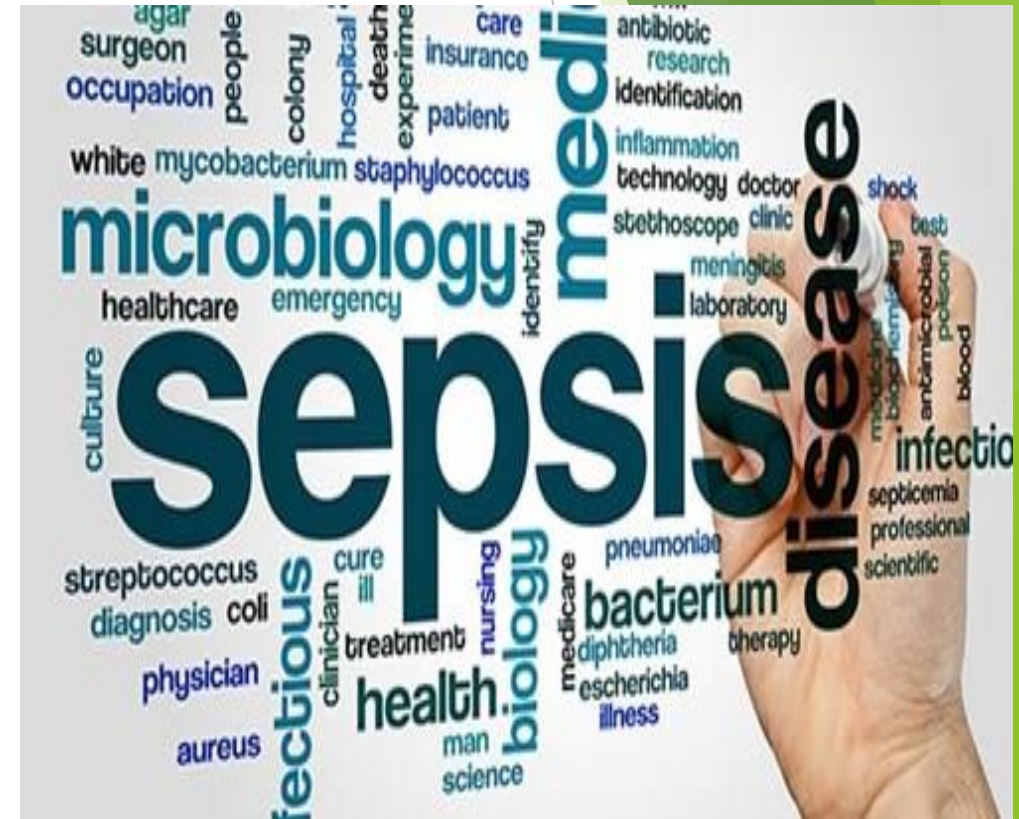
- ▶ Renal failure
 - Monitoring uo
 - Avoid hyperkalemia
 - Use of osmotic or loop diuretics for fld mx
 - Avoid renal toxic meds
 - Dialysis



Common complications and Mx

► Sepsis

- Early and aggressive pulm hygiene, early ambulation
- Early nutrition support
- Strict sterile technique during invasive procedures
- Discontinuing lines
- Good perineal hygiene
- most common source of sepsis urine, pulmo, and GI



Axioms and Best Practice Guidelines: Principles of Management

- ▶ Disposition: GT w/ significant injury to one or more organ system, 2 or more rib fx, lactate of >2 , or concerning VS trend- \rightarrow Where will this pt go from ED?
- ▶ Consider Multidisciplinary team approach-Comprehensive Geriatric Assessment
- ▶ Proactive geriatric consultation has been associated with fewer episodes of delirium, fewer in-hospital falls, lesser likelihood of discharge to a long-term care facility, and a shorter length of stay.
- ▶ Clarify Advance Directives/POA





FINISH LINE



Beautiful young people are accidents of nature,
but beautiful old people are works of art.

(Eleanor Roosevelt)

izquotes.com

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