Learning Objectives

• Discuss the growing epidemic of geriatric trauma.
• Review physiological changes that occur with aging.
• Provide information on common injuries seen in the geriatric trauma patient.
• Review nursing concepts of care in the geriatric trauma patient.
Disclosure Statement

- I have nothing to disclose relative to this educational activity.
Successful Completion

• To successfully complete this course, participants must attend the entire event and complete/submit the evaluation at the end of the session.

• Society of Trauma Nurses is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.
Aging Population

- Older Adult: \( \geq 65 \)
- Approximately 12% of current population
- Expected to be 20% by 2030
- “Baby Boomer” generation- 1946-1964

Trends in Older Adult Population
- Overall world population aging
- Life expectancy increasing
- \( \geq 85 \) fastest growing group

Expected Population Growth 1900-2050

Population 65+ by Age: 1900-2050

Source: U.S. Bureau of the Census

Number of Persons 65+

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<th>75-84</th>
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Age
- 65-74
- 75-84
- 85+
Figure 2-1.
Percentage of Population Aged 65 and Over: 2015 and 2050

2015

2050

Percent
- 28.0 or more
- 21.0 to 27.9
- 14.0 to 20.9
- 7.0 to 13.9
- Less than 7.0

World percent
2015: 8.5
2050: 16.7

Geriatric Trauma Epidemic

• Growing population and complexity
• Public health crisis
• Many unknowns
• Lack of geriatric specific education
• Under triaged- less likely to be transported to a trauma center
• Expected to account for 40% of trauma population by 2050
• Interdisciplinary team approach
• Focused care on unique needs
• Research
Recognition of a Public Health Crisis

• ACS TQIP Geriatric Trauma Management Guidelines
• Geriatric Trauma Coalition (GeriTraC)
  • First Meeting- May 13, 2015
  • Mission statement: *To improve geriatric trauma care through an interdisciplinary approach to:*
    • Injury Prevention
    • Transport and Triage
    • Initial assessment and hospital management
    • Transitions of care
• STN- Geriatric SIG
Geriatric Trauma Mechanism of Injury

• **Falls #1**
  • Most common method of injury in the elderly
  • Falls are the most common cause of hip fractures and TBI’s
  • 90% simple falls, such as fall from standing
  • Active elderly- higher falls
  • Far less mechanism to produce injuries
Mechanism of Injury: Motor Vehicle Collisions

• **Motor Vehicle Collision**
  - Number of fatal crashes almost doubles by age 85
    - Roadway type, number of lanes, speed limit, etc. are important factors
  - Sensory changes
  - Perceptual changes
  - Cognitive decline
  - Motor decline
• Slower reaction times, more collisions, drove slower, less able to maintain a constant distance behind a pace car
• Loss of independence
• Family discussions
• Education
• Support
Mechanism of Injury: Suicide

**Suicide statistics**
- 65 and older- among the highest suicide rates
- Nearly 20% of all suicides
- Most common method involves firearms
- Risk factors: White, male, depression, chronic pain or illness, sleep disturbance, anxiety, and social isolation
- Of those who committed suicide:
  - 70% PCP within 1 month
  - 1/3 PCP within 1 week
- Depression screening
Figure 1. United States suicide rate by age (1999–2013). *(Adapted from CDC mortality data obtained from Xu et al.¹)*
Elder Abuse

• 1970’s
• Under-recognized
• As many as 10% of U.S. older adults experience elder mistreatment each year
• Involves a trusting relationship
• Types of Abuse:
  • Sexual abuse
  • Psychological abuse or verbal abuse
  • Neglect
  • Financial exploitation
  • Physical abuse
• Less than 1 in 24 cases of elder abuse are identified and reported to authorities
• Extreme cases recognized, most cases are subtle
• Dementia, functional impairment and poor physical health - greatest risk
• Perpetrators: adult children, spouses, male, hx of substance abuse, mental/physical health problems, hx of trouble with police, socially isolated, unemployed, financial problems, and under major stress
GERIATRIC CONCEPTS OF CARE
Why is Geriatric Trauma Care Important?

- Trauma is the 5th leading cause of geriatric mortality
- Increased morbidity ... NOT always due to the injury!
  - Hospital acquired complications
  - Exacerbation of co-morbidities
- Compared with younger patients with same injuries
  - Longer hospital stays
  - Longer inpatient rehab stays
  - Increased skilled nursing facility requirement
  - More complications
  - Increased mortality
  - Increased dependence for ADL’s

High Risk Population

• Physiological changes in all body systems
• Less reserve
• Complex Care
  • Susceptible to adverse outcomes from minor trauma
  • Frailty
  • Geriatric syndromes
• Elderly trauma in hospital complication rate higher
  • Cardiovascular events (MI, Afib, CHF, etc.)
  • Pneumonia
  • Sepsis
• Complications lead to poor outcomes and high cost healthcare

Atypical Presentation of Disease

- Presentation is vague, altered or not presented at all
- Signs of 1 disease hidden by signs of another
- Common conditions
  - Infections
  - Falls
  - Urinary incontinence
  - MI
  - CHF
- Symptoms/signs often subtle include nonspecific declines in function or mental status, decreased appetite, incontinence, falls, fatigue, exacerbation of chronic illness
- Fever blunted or absent in very old, frail, or malnourished.
  - Baseline oral temperature in older adults is 97.4° F versus 98.6° F in younger adults
- Note any change from baseline in function, mental status, behavior, appetite, chronic illness
Cascade Iatrogenesis

- A series of adverse events or effects caused by a medical or nursing intervention that was initially used to solve a prior symptom
- Difficult to reverse
- Associated with poor prognosis after hospital discharge

Factors that Increase Risk of Iatrogenesis

- Polypharmacy
  - Adverse Drug Event most common cause
- Atypical presentation of illness
- Many comorbid chronic illnesses
- Impaired cognitive and functional capacity
- Reduced physiologic reserve
- Altered compensatory mechanisms

What is Frailty?

• **Definition**: A state of low physiologic capacity and increased susceptibility to disability because of age-related loss of physical, cognitive, social, and psychological functioning

• Combination of age-related changes and assorted medical problems
  • Exhaustion
  • Unintentional weight loss (>10lbs)
  • Muscle weakness
  • Walking slowly
  • Low physical activity level
Frailty

• High Risk for iatrogenesis

• Why is Frailty important in trauma?
  • Aging rates vary
  • Age has not been shown to predict outcomes
  • Frailty has shown to be a better predictor in trauma
  • Old active vs. Old frail

• Trauma Specific Frailty Index- Abbreviated 15 points
  • Higher scorer score= more frail, more likely of unfavorable outcome

Geriatric Syndromes

• Can result as an outcome of iatrogenesis and frailty
• Impact morbidity and mortality
  • Sleep Disorders
  • Problems with Eating or Feeding
  • Incontinence
  • Delirium
  • Falls
  • Skin Breakdown
Functional Status & Functional Decline

• Functional Status
  • Ability to perform basic self-care activities
  • Strong predictor of poor outcomes
  • Indicator of Quality of Life
  • Baseline status

• Prevention of Functional Decline
  • 34%-50% of hospitalized older adults
  • Many do not regain lost function

• Increased
  • LOS
  • Mortality
  • Institutionalization
  • Longer rehab and home health services
  • Healthcare resources

• Minimal research in trauma....

INJURY PATTERNS IN THE ELDERLY
Geriatric Considerations: Initial Assessment

- Spine immobilization
- Mechanism of injury
- Age, Frailty
- Pain
  - Report less pain thereby limiting injury discovery
- Home medications
  - Polypharmacy
  - Beta Blockers
  - Anticoagulants
- Vital Signs
  - Altered response to trauma
  - Increased mortality if HR>90 bpm or SBP <110mmHg
- Comorbidities
- Baseline cognitive status
- Baseline functional status
- Advance Care Planning
- Alcohol/Drugs
Response to Shock

- **Cardiovascular Changes**
  - Decreased compensatory response
  - Decreased CO and reserve
  - Catecholamine insensitivity
  - Atherosclerosis
  - Myocyte fibrosis
  - Conduction Abnormalities

- **Medications**
  - Beta blockers blunt the stress response to shock and can mask underlying hypoperfusion
  - Under-identification of significant blood loss

- Decreased ability to survive cardiovascular stress
Neurological Changes with Aging

- Brain weight decreases
  - 10% between age 30-70
- Decreased number of neurons
- Slower reflexes
- Decreased speed of nerve impulse travel
- Sensory and motor decline
- Dementia and cognitive impairment may delay treatment
- Patient presents with mild mechanism- may have a significant underlying SDH or Epidural
Head Injuries in the Elderly

- 2 major risk factors:
  - Dura becomes adherent to the skull with aging
  - Anticoagulant use
    - Approximately 11-20% on Coumadin at the time of injury
    - New anticoagulants
      - Direct thrombin inhibitors
      - Factor Xa inhibitors

- Low threshold for CT with any neuro changes
  - Occult injuries common
  - Minimal risk of radiation

- Mortality rates 2-5x’s younger with matched GCS & intracranial pathway

- Increased age is an independent predictor of worse outcome from TBI
Age-Associated Changes in the Musculoskeletal System

- Sarcopenia occurs, resulting in increased weakness and poor exercise tolerance
  - Sarcopenia - decline in muscle mass and strength associated with aging
  - Increased risk of disability, falls, unstable gait
- Lean body mass replaced by fat with redistribution of fat
- Bone loss
- Decreased ligament and tendon strength
- Intervertebral disc degeneration
- Articular cartilage erosion
- Changes in stature with kyphosis, height reduction
- Prevention of osteoporosis - Calcium, Vit D, physical exercise, smoking cessation
Musculoskeletal Trauma

• Fractures
  • Humerous
  • Clavicle
  • Ribs
  • Femur
  • Pelvic
    • Pubic rami most common

• Hip Fractures
  • Outcomes improved with multidisciplinary team
  • Protocols that promote early operative intervention (<48hrs)
  • Early ambulation
  • Early physical therapy

• Elderly less likely to have “severe” pelvic fractures, yet have far higher mortality

• Higher rates of hemorrhage despite lower fracture severity
Cervical Spine Fractures

- Odontoid Fractures most common
- Geriatric patients more upper C-spine fx
  - Non-geriatric more lower C-spine fx
  - Initially the most mobile segment of C4-C7 stiffens with age
- Increased risk of cervical spine injury
  - DJD, osteoporosis
  - Less muscle and ligament support
- Central Cord Syndrome
  - More common in the elderly
  - Hyperextension injury
  - High risk of depression
- Nonoperative vs Surgical Management
Facial Fractures in the Elderly

- Typically minimally displaced fractures
- Surgical vs. Non-surgical intervention
- LOS and mortality increased when compared to younger patients
- Nursing Care
  - Airway
  - Ice
  - Pain control
  - HOB elevated
  - Mobilize
- Concussions
Age-Associated Pulmonary Changes

• Decreased respiratory muscle strength; stiffer chest wall with reduced compliance
• Diminished ciliary and macrophage activity, drier mucus membranes.
  • Increased risk of infection and bronchospasm with airway obstruction
• Decreased cough and mucus/foreign matter clearance
• Decreased response to hypoxia and hypercapnia
• Reduced pulmonary functional reserve
• At rest: No change
• With exertion: Dyspnea, decreased exercise tolerance
• Decreased chest/lung expansion with less effective exhalation.
Rib Fractures

• Osteoporosis decreases rib durability
• Increased incidence of
  • Rib fractures
  • Sternal fractures
  • Pulmonary contusions
• Weakened respiratory muscles
  • Alveolar surface area loss
  • Decreased chest wall compliance
  • Decreased vital capacity, functional residual capacity
• Rib fractures and flail chest have a significantly higher morbidity and mortality in elderly
Rib Fractures

• Poor outcomes related to physiologic changes with aging
• Increased splinting leads to
  • Hypoventilation, atelectasis and pneumonia
• *Increase in number of rib fractures*…..
  
  *Increase in complication risk!*

• Nursing interventions
  • Pain Control
  • Aggressive pulmonary toileting
  • Mobilization
  • Protocols

• Rib Plating
Rib Fracture Protocol

• Admission
  • ICU vs. Med-Surg placement
    • Associated with life threatening or polytraumatic injuries
    • Severe pulmonary contusion
    • 4 or more rib fractures
    • Rib fractures with respiratory compromise
      • Oxygen saturations, pain control, co-morbid conditions, etc.

• Respiratory Therapy involvement
  • Chest Trauma: Ribs, PTX, HTX, sternal fracture

• Splinting

• Pulmonary toileting- OOB is best!
Age-Associated Changes in the Renal and Genitourinary Systems

• Decrease in kidney mass, blood flow, GFR (10% decrement/decade after age 30).
  • Reduced renal functional reserve; risk of renal complications in illness
• Decreased drug clearance
  • Risk of nephrotoxic injury & adverse drug reactions
• Risk of volume overload, dehydration, hyponatremia (thiazide diuretics), hypernatremia (fever)
• Reduced bladder elasticity, muscle tone, capacity
• Increased postvoid residual, nocturnal urine production
• In males, prostate enlargement with risk of BPH
• Increased risk of urinary urgency, incontinence (not a normal finding), urinary tract infection, nocturnal polyuria.
Age-Associated Changes in the Oropharyngeal and GI System

- BMI: 18.5-24.9 kg/m2 healthy
- Decreased gastric motility with delayed emptying
- Atrophy of protective mucosa
  - Risk of chewing impairment, fluid/electrolyte imbalances, poor nutrition
  - Gastric changes: altered drug absorption, increased risk of GERD, NSAID-induced ulcers
- Malabsorption of carbohydrates, vitamins B12 and D, folic acid, and calcium
- Impaired sensation to defecate
  - Constipation not a normal finding
  - Risk of fecal incontinence with disease (not in healthy aging)
- Reduced hepatic reserve. Decreased metabolism of drugs
Malnutrition in the Geriatric Population

- Diminished senses of taste and smell
- Changes in dental status and decreased ability to chew or swallow certain foods
- Reduced visual and auditory senses
- Medication use that may have an adverse effect on appetite
- Confusion from delirium or dementia
- Depression
- Eating alone

Nutrition

- Malnutrition can contribute to functional decline
- Trauma Patients at high risk of malnutrition
  - Head injuries
  - Hypermetabolism
  - Malnutrition pre-injury
  - NPO
  - Collars
  - Facial injuries
  - Dysphagia
  - Immobility
  - Pain

Nutritional Support

• Supplements with meds
• Nutrition Consultation
  • Supplements
  • Calorie Counts
  • Weights
• Encourage OOB for meals
• Socialization
• Ensure hydration
• Speech Therapy
Geriatric Trauma Nutrition Protocol

- Nutrition consultation based on acute injury:
  - Major fractures: hip fx, pelvic fx, femur fx, humerus fx
  - BMI <20
  - C-Spine fractures
  - Multiple facial fractures
  - Swallow evaluation with change from baseline diet
  - Stage II or greater PU, extensive soft tissue injuries
  - Poor appetite x 5 days (including ICU stay)
IMPROVING GERIATRIC TRAUMA CARE
Geriatric Consultation

- Proactive consultation model
- Comprehensive geriatric assessment
  - Prevention and management of geriatric syndromes
  - Function preservation
  - Discharge planning
- Improved outcomes
- Decreased hospital-acquired complications

Overall, are we prepared?

- Geriatric Education limited
- <1% of RN’s are certified in gerontology nursing
- Evidence indicates
  - *patient outcomes improve when older adults receive care from nurses with geriatric training*
- Geriatricians

A Plan for Improved Geriatric Care Recognized

• Only 8.8% of Trauma Centers in the U.S. incorporate Geriatric Resource Programs
  • Mostly Level I Trauma Centers
• 17 of 26 Trauma Centers in PA are Geriatric Resource Program Sites (65%)
• Extent of incorporation of Geriatric Resource Programs unknown

Nurses Improving Care for Healthsystem Elders (NICHE)

- Nurse Driven program designed to help hospitals improve the care of older adults

**VISION**
- All patients 65-and-over to be given sensitive and exemplary care

**MISSION**
- Provide principles and tools to stimulate a change in the culture of healthcare facilities to achieve patient-centered care for older adults

Geriatric Resource Nurse Model (GRN)

- Evidence-based geriatrics within clinical practice
- Prepares nurses as clinical resource leaders on geriatric issues
- Considered the foundation for improving geriatric care
- Patient Care Associate (GPCA)
What can NICHE do for Trauma?

- How does this work for trauma?
- How do we incorporate NICHE concepts in trauma care?
- Physician Champions
- Geriatric Trauma Process Improvement
- Geriatric Trauma specific education
- Develop Geriatric Resources
Preventing Recurrent Falls

• Consider cause of fall

• Orthostatic Blood Pressures
  • All patients 65 and older admitted s/p fall
  • Medications
  • Dehydration

• Fall Precautions

• Patient and Family Education

• Environmental Adaptations
Pain Control

• Assessments
  • Appropriate pain scale
  • Non-verbal signs
• More likely to tolerate pain than report it

• Barriers:
  • Cognitive impairment
  • Fear of addiction
  • Side effects
  • Sensory impairment
  • Under-reporting

• Uncontrolled Pain
  • Delirium
  • Decreased mobility
  • Decreased participation in ADL’s
  • Respiratory compromise

• Elderly may not verbalize their injury as “pain”
  • Ache, hurt, discomfort
Pain Control

• Treat it.....
  • Start low, go slow!
    • 50%-75% of normal dose and titrate

• Variations in levels of pain

• Acute and Chronic Pain

• Appropriate medications

• Non-pharmacological pain interventions

• Cognitively impaired most vulnerable

• Bowel regimen

• Pain Medication Resource developed with recommended medications and doses
Delirium

• Frequently seen in Geriatric Trauma patients- “confusion”

• Increased:
  • LOS, functional and cognitive decline, re-admissions, mortality, facility placement, and falls

• 3 Types of Delirium
  • Hyperactive
  • Hypoactive
  • Mixed

• Predisposing Risk Factors
  • Age, cognitive impairment, history of delirium, dementia, stroke, visual/hearing impairment, lives alone or in a facility, alcohol abuse

• Precipitating Risk Factors
  • Environmental- foleys, restraints, medications, surgery, pain, immobilization, change in surroundings
Delirium Prevention

- Baseline assessment
- Routine Screening (CAM/CAM-ICU)
- 30-40% of cases are preventable
  - Avoid inappropriate drugs
  - Avoid use of restraints
  - Reorientation and behavioral interventions
  - Clear instructions
  - Minimize sensory impairments
  - Environmental
  - Nonpharmacological sleep protocols
  - Geriatric consultation

- Prevention is key! Treat underlying cause! Education
Immobility

- Loss of muscle mass and strength
- Orthostasis
- Falls
- SNF placement
- As early as day 2 of hospitalization functional decline can start
- Mobility inadequate overall in hospitals
- Older adults spend >80% of their day in bed during hospitalization
Mobility

- Spine clearance
- Determine baseline functional status
- Encourage participation in ADL’s
- Early mobilization
  - Within first 48 hours
- PT/OT consult
- Assistive devices
- Progressive mobilization
- Ambulate!
Sleep

• Important to overall physical and psychological well-being
• Sleep often disrupted during hospitalization
• Impacts healing and health recovery
• Adverse Outcomes
  • Delirium
  • Decreased glucose tolerance
  • Changes in thermoregulation
  • Increased levels of inflammatory cytokines
  • Increased anxiety
  • Impaired cognitive performance

Sleep Hygiene Protocol

• Noise Reduction
• Dim lights
• Aromatherapy
• Massage
• Snack
• Toileting
• Protected sleep time
  • Neuro checks
  • Vital Signs
  • Labs
Diversional Activities

• A form of recreation which helps individuals by turning their attention away from their illness to another interest
• Occupies the individual’s mind and fosters their return to health
• Helps a person to regulate emotions, thoughts, and behaviors by self soothing
  • Pain
  • Anxiety
  • Frustration
  • Confused
  • Hungry
  • Tired
Geriatric Focused Collaborative Rounds

- Coordination of Care
- Geriatric Resource Nurse
- Trauma Team
- Medicine/Geriatrician
- Case Management
- Registered Dietician
- Physical Therapy/Occupational Therapy
Geriatric Considerations in Collaborative Rounds

• Early mobilization
• Orthostasis
• Medication Changes
• Pain Control
• Nutrition
• Delirium prevention and recognition
• Family
• Disposition
Geriatric Specific Outcome Measures

• Length of Stay
• Mortality
• Discharge Destination
• Complications
• Transfers to higher level of care
• Transfers back to ICU
• Readmissions
  • Community Resources
  • Caregiver Fatigue
References

- Geriatric Trauma Coalition
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