TRAUMA ALERT: THE OLDER ADULT TRAUMA PATIENT - FIX ME QUICK

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HonorHealth
John C. Lincoln Medical Center

Learning Objectives:
● Prevalence of geriatric trauma.
● New management strategies.
● Aggressive approach to care.

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Alicia Mangram, MD, FACS does not have a significant financial interest or other relationship with manufacturer(s) of commercial product(s) and /or provider(s) of commercial services discussed in this presentation.
Geriatric Trauma “G-60”
Better Call 911
The Older Adult in the ER

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Program Director General Surgery Residency
John C. Lincoln Hospital North Mountain
Phoenix, AZ

NO DISCLOSURES
Life expectancy is increasing, people are living longer

Life Expectancy in 1900 was about 50 Years
Current life expectancy is 78 Years
Growth in Geriatric Population

Elderly Population Growth

The Aging of America

<table>
<thead>
<tr>
<th>Decade</th>
<th>Number (millions)</th>
<th>Increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2010</td>
<td>35-40</td>
<td>14</td>
</tr>
<tr>
<td>2010-2020</td>
<td>40-55</td>
<td>38</td>
</tr>
<tr>
<td>2020-2030</td>
<td>55-72.1</td>
<td>31</td>
</tr>
</tbody>
</table>

Age > 65 is one of the fastest growing age groups.

Source: U.S. Census Bureau, 2010.
### Demographics: 85+ years

- In 2009, people age > 85 years numbered 5.6 million
- In 2010, this subset increased to 5.8 million
- By 2020 this subset is expected to reach 6.6 million: 15% increase for the decade

### Geriatric Trauma

- Mortality/morbidity after trauma is strongly correlated with increasing age
- Trauma death rate per year [per 100,000]
  - All age groups = 56
  - Age >65 = 113.2

### Violence and Injury

Injury and violence are serious threats to the health and well-being of Americans ages 65 and older.

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10 Leading Causes of Death (2010): 65+

1. Heart Disease
2. Cancer
3. Chronic low respiratory disease
4. Stroke
5. Alzheimer’s Disease
6. Diabetes Mellitus
7. Influenza & Pneumonia
8. Nephritis
9. Unintentional Injury
10. Septicemia

Healthcare and Modern Day Life Expectancy

CDC Data:
1900 life expectancy in U.S. – 49 years
2011 life expectancy in U.S. – 79 years

Rise in Geriatric Trauma

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Increasing Geriatric Trauma

Distribution of Trauma Deaths
Mechanism: Age<60 vs. Age>=60 (2008‐2012)

<table>
<thead>
<tr>
<th>Trauma Mechanism</th>
<th>Age&lt;60 years</th>
<th>Age&gt;=60 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSW</td>
<td>29.7%</td>
<td>10.3%*</td>
</tr>
<tr>
<td>MVC</td>
<td>26.3%</td>
<td>28.3%</td>
</tr>
<tr>
<td>FALL</td>
<td>2.9%</td>
<td>33.2%*</td>
</tr>
</tbody>
</table>

* p<0.05

Prioritized Questions: 2008

• Should patients older than 60 years with poly‐trauma and/or a significant mechanism of injury be considered as meeting the criteria for Trauma Team Activation (TTA)?
• Why should patients age>60 with minor injury severity scores (0‐9) not be considered for TTA?
• Would these patients benefit from a higher level of activation?
Retrospective Review

- The National Trauma Data Bank (NTDB) was queried for the period of January 1, 1999 to December 31, 2008, for all trauma patients and associated injury severity score (ISS).
- Data abstracted was based on patient’s age and ISS.
- For the period of review, the NTDB contained 802,211 trauma patients.
- Elderly patients (age >60 years) accounted for 21% of all patients.

NTDB Comparison of Morbidity

<table>
<thead>
<tr>
<th>ISS Category</th>
<th>% Morbidity</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 13-60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &gt; 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor (0-9)</td>
<td>1.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Major (10-15)</td>
<td>4.8</td>
<td>10.4</td>
</tr>
<tr>
<td>Severe (15-24)</td>
<td>10.9</td>
<td>16.4</td>
</tr>
<tr>
<td>Critical (&gt;24)</td>
<td>27.3</td>
<td>28.0</td>
</tr>
</tbody>
</table>

Conclusion - 2008

- A relation exists between increased age, associated pre-existing medical conditions, and a poor physiologic reserve with resultant poorer outcomes.
- It is essential to not under-triage the elderly patient with minor or major ISS.
- A high index of suspicion is imperative with the elderly trauma patient.
Should Age Be a Factor to Change From a Level II to a Level I Trauma Activation?

Vanessa K. Shifflette, MD, Manuel Lorenzo, MD, Alicia J. Mangram, MD, Michael S. Truitt, MD, Joseph D. Amos, MD, and Ernest L. Dunn, MD

The Journal of TRAUMA® Injury, Infection, and Critical Care • Volume 69, Number 1, July 2010

Working Hypothesis: 2008-2011

Patient age>60 is an independent predictor variable with interactions with pre-existing co-morbidities and poor physiologic reserve which together are determinants for increased morbidity and mortality among geriatric trauma patients.

Working Hypothesis

The trauma care given to older trauma patients should be distinctive from care younger trauma patients require with the same injuries.
• Treating patients with isolated injuries in a setting of chronic medical problems can lead to fragmentation of care delivery

• Who will assume responsibility for these patients?

We organized a geriatric trauma unit, led by trauma surgeons, that was specifically designed to expedite the care of geriatric patients through a multidisciplinary approach
METHOD

- Multiple Meetings w/ variety of specialties:
  - Physical/occupational therapy
  - Social worker
  - Case coordinator
  - Trauma coordinator
  - Respiratory therapy
  - Pharmacy
  - Nutritionist
  - Floor Nurse Supervisor
  - Emergency department liaison
  - Internal medicine hospitalist
  - Physical medicine and rehabilitation

Benchmark/Timeline

- From Inception to fulfillment @ 6 months
- We now have an active geriatric trauma service, called the “G60”

INCLUSION CRITERIA

- Age ≥60
- Traumatic injury requiring hospital admission
- Injury occurred within the previous 48 hours
- Above criteria met = G-60 Activation
**G-60 ACTIVATION**

- Seen first by ED physician to establish criteria
- G-60 activation paged to all relevant services
  - Trauma service, hospitalist, PT/OT, nutrition, RT, G60 nurse supervisor, social work, case manager, pharmacy
- Goal of activation-to-exam of 30 minutes
- Appropriate sub-specialists notified
  - Seen by trauma service and hospitalist initially
- Expedited pre-procedure medical clearance
- Admitted to SICU or G60 Service

**GOALS**

- 30 minutes – ED presentation to trauma service evaluation
- 4 hours – ED presentation to inpatient room
- 36 hours – ED presentation to operating room
- 5 days – ED to safe and appropriate disposition

**Trauma Surgeon Leadership**

- Multidisciplinary
- Continuous Total Quality Improvement
- Strong Leadership
- Effective communication
The Creation of a Geriatric Trauma Unit “G-60”

Alicia J. Mangram, MD,
Vanessa K. Shifflette, MD,
Christopher D. Mitchell, MD,
Van A Johnson M.D., Manuel Lorenzo, MD, Michael S. Truitt, MD, Anuj Goel, MD,
Mark A. Lyons, MD,
and Ernest L. Dunn, MD,
Dallas, Texas

*The American Surgeon 77: 1144-1146 (2011)

G-60 Trauma

Our 1-Year Experience

Seniors At Risk For Injury: Falls

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### OUTCOMES

<table>
<thead>
<tr>
<th>Control (n=280)</th>
<th>G 60 (n=393)</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average ED LOS (hours)</td>
<td>6.1</td>
<td>4.2</td>
</tr>
<tr>
<td>Average ED to OR (hours)</td>
<td>52.9</td>
<td>37.6</td>
</tr>
<tr>
<td>Average SICU LOS (days)</td>
<td>5.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Average Hospital LOS (days)</td>
<td>7.0</td>
<td>4.8</td>
</tr>
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</table>

### MORBIDITY

<table>
<thead>
<tr>
<th>Control (n=280)</th>
<th>G 60 (n=393)</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTI</td>
<td>3.9% (11)</td>
<td>1.5% (6)</td>
</tr>
<tr>
<td>Respiratory Failure</td>
<td>6.8% (19)</td>
<td>1.3% (5)</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>1.4% (4)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>1.4% (4)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1.7% (5)</td>
<td>0.2% (1)</td>
</tr>
<tr>
<td>DVT</td>
<td>0% (0)</td>
<td>0.2% (1)</td>
</tr>
<tr>
<td>PE</td>
<td>0.07% (2)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Deep Vein Thrombosis Ulcer</td>
<td>0.09% (0)</td>
<td>0% (0)</td>
</tr>
</tbody>
</table>

### MORTALITY

<table>
<thead>
<tr>
<th>Control (n=280)</th>
<th>G 60 (n=393)</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>5.7% (16)</td>
<td>3.8% (15)</td>
</tr>
</tbody>
</table>
Geriatric Trauma Service: A one-year experience

Alicia J. Mangram, MD, Christopher D. Mitchell, MD, Vanessa K. Shifflette, MD, Manuel Lorenzo, MD, Michael S. Truitt, MD, Anuj Goel, MD, Mark A. Lyons, MD, Deborah J. Nichols, RN, and Ernest L. Dunn, MD, Dallas, Texas


Time to move
Acute Care “G60” Surgery Service

- FUTURE DIRECTIONS

87% of all fractures in the elderly are due to falls

53% who sustain hip fracture will experience another fall in 6 months
Hip Fractures

• Annually, more than 300,000 people in the United States fracture a hip

HIP FRACTURES IN GERATRIC PATIENTS

What Is The Problem or Challenge

• Increase in geriatric falls
  - ↑ Mortality
  - ↑ Morbidity
  - Hip fractures
   - Pain

• Current pain management strategies are inadequate
  • Standard Analgesic Care (SAC): Suboptimal
    - ↑ Delirium
    - ↑ Neurotoxicity
    - ↑ Cardiovascular Complications
    - ↑ GI Complications
    - ↑ Urinary Retention

• Optimal strategy remains elusive
  • Continuous Fascia Iliaca Block (CFIB) more effective than SAC?
Implemented Intervention

- We implemented US guided CFIB protocol for pain management in patients with hip fractures. We hypothesize that CFIB will provide effective pain control.
  - **Inclusion Criteria**
    - Age ≥ 60
    - Screened for placement
  - **Exclusion Criteria**
    - Age < 60
    - Survival < 24 hours
  - Control (SAC alone) and Treatment Group (SAC+CFIB)

(Please describe intervention details here.)
Re: WTA-2015-151R3
“Geriatric Trauma G-60 Falls with Hip Fractures: A Pilot Study of Acute Pain Management Using Femoral Nerve Fascia Iliac Blocks”

Dear Dr. Mangram:

Thank you again for submitting your work to the Journal of Trauma. We are pleased to inform you that your manuscript has been accepted for publication – congratulations!

As you have provided sufficient and complete responses to your manuscript’s initial critiques, we will not request any further revision. Instead, your paper will be sent directly to production, where a typeset and copy-edited version will be created. You will have the chance to make any final, minor corrections to these page proofs prior to print publication.

Success!

Develop success from failures. Discouragement and failure are two of the surest stepping stones to success.”

Dale Carnegie

The successful warrior is the average man, with laser-like focus.”

Bruce Lee

Rib Fractures in the Elderly
Chest Trauma (a persistent problem)

- Accounts for 10-15% of trauma admissions
- Associated in 25% of traumatic deaths
- Rib fractures occur in up to 39% of blunt trauma patients
  - associated with significant thoracic and non-thoracic injuries
- Rib fractures alone can lead to pulmonary insufficiency and prolonged convalescence
- 60% of patients who suffered flail chest do not return to full-time employment even at 5 years post injury

Flail Chest

- Defined as 3 or more ribs with segmental fractures
- Epidemiology
  - Incidence 10-25% of severe chest trauma
    - Bimodal distribution
      - Younger trauma patients
      - Older patients with osteopenia
- Mechanism
  - Blunt forces
  - Deceleration injuries
- Associated Injuries
  - Scapula fractures
  - Clavicle fractures
- Prognosis
  - Varies depending on underlying pulmonary injury or other concomitant injuries
• Retrospective cohort study
• 171 patients
• 4 groups
  – 1) 15-44 y/o w/ 1-4 rib fractures
  – 2) 15-44 y/o w/ >4 rib fractures
  – 3) > 44 y/o w/ 1-4 rib fractures
  – 4) > 44 y/o w/ >4 rib fractures
• Group 4 had increased ventilator days, ICU stay, and hospital stay
• Conclusion: Patients over age 45 with >4 rib fractures are at increased risk for adverse outcomes

Conclusions: The operative group demonstrated a significant reduction in total ventilator days as compared with the nonoperative group (4.5 [0-30] vs 16.0 [4-40]; P = .040). Patients with SRF were permanently liberated from the ventilator within a median of 1.5 days (0-8 days).

Matrix Rib

Plates are precontoured to fit an average rib shape, which minimizes intraoperative bending

- Intramedullary splints allow minimally invasive procedures
- Locking design for increased stable fixation
- Designed to be used without removal of the periosteum
This is a 90 yo female, very pleasant who sustained a GLF

Discussed options:
Pain meds
Aggressive pulmonary toilet
Surgery
ACS TQIP Geriatric Trauma Management Guidelines

“G60” Summary

- Falls with Broken Bones are Traumatic
- They should be on the Trauma team
- Multidisciplinary approach is best
- COT see the importance of “G60” guidelines!!
- Procedures will come just take care of the patient

G-60 is NOT COMING SOON

G-60 is HERE!!

HERE’S TO THE FUTURE!