The Role of Frailty in Trauma & Surgery

Bellal Joseph MD, FACS
Professor and Chief of Surgery
Division of Trauma and Acute Care Surgery
Nothing to Disclose
125 years

109 all the time
Twenty Years Ago in the Journal of Trauma

Differences in Mortality between Elderly and Younger Adult Trauma Patients: Geriatric Status Increases Risk of Delayed Death

Perdue, Phillip W. MD, MPH; Watts, Dorraine D. RN, PhD; Kaufmann, Christoph R. MD, MPH; Trask, Arthur L. MD


Article

Background: Elderly patients suffer higher mortality rates after trauma than younger patients. This increased mortality is attributable to age, preexisting disease, and complications as well as injury severity.

Methods: Records from 5,120 adult patients from a Level I trauma center were retrospectively reviewed. Injury Severity Score (ISS), Revised Trauma Score (RTS), early mortality (<24 hours), and late mortality (>24 hours) were determined for elderly (>65 years) and younger (16-64 years) patients. Preexisting diseases and complications were identified by International Classification of Diseases, Ninth Revision, Clinical Modification diagnosis coding.

Results: Mortality in elderly patients was twice that in younger patients despite equivalent injury severity (p < 0.001), and elderly patients were more likely to suffer later death than younger patients (p < 0.005). The prevalence of preexisting disease was greater in the elderly, as was the incidence of complications. Using logistic regression, ISS, RTS, preexisting cardiovascular or liver disease, the development of cardiac, renal, or infectious complications, and geriatric status were all independently predictive of late mortality (p < 0.01).

Conclusion: Elderly trauma patients more frequently suffer late mortality than younger patients because of the combination of injury and increased preexisting disease and complications after injury. Aggressive treatment of the elderly trauma patient is warranted. However, in the face of significant preexisting disease or complications, survival is less likely. Predictive models of survival can be developed, taking into account preexisting disease and complications as well as admission parameters such as age, ISS, and RTS, and specific risk of mortality quantitated.

How Have we Changed in 2018?

Elderly patients suffer ↑ Mortality after trauma compared to younger patients.

In 1998 this was found to be Attributable to:
- Preexisting disease
- Higher incidence of complications
- Increased Age

What variables are we using now?
Yes, things are looking good for our elderly patients and us aging surgeons. As we understand the aging process and create safer environments, we can get our patients through complex surgery with acceptable morbidity and mortality. Now we need to start to recognize other curve balls our elderly patients throw us, which when controlled can improve survival even more—issues like dementia, delirium, polypharmacy, unrecognized alcoholism or abuse, and the need for dedicated geriatric services. The American College of Surgeons and the American Geriatrics Society have teamed up to increase research and awareness in these areas. There is a lot we do not know, that we weren’t taught, and that we need to study. Maybe next time I’ll go to the next level and talk about nursing homes.
TRANSFORMATION

- Marked change in form, nature, appearance process by which one figure or function is converted into another one of SIMILAR VALUE
AGING

Focus is Shifting
INTRODUCTION

Expectations
INTRODUCTION

Reality
SILVER SERVICE

GERIATRIC

How Do you Decide ICU, Geriatric, Rehab

Family Discussions – Objective Data

Quality Hospital/Surgeon Data
Why Should We Distinguish Geriatric Patients?
Geriatric Trauma

Falls
Morbidity
Delirium
Presbycusis
Cardiac
Arrest
Decline
Intubation
Malignancy

Transfusion Protocol
vasopressors
Traumatic brain injury
GCS
Burns
Parkinson’s disease
Injury severity score

Dementia
Extrication
Depression
Trauma
Hypertension
Anxiety

Arrest
Cardiac
Malignancy
Falls
Presbycusis

Chronic kidney disease
Cirrhosis

Cardiac arrest

INTRODUCTION
Improving Mortality Following Emergency Surgery in Older Patients Requires Focus on Complication Rescue

Kyle H. Sheetz, Seth A. Waits, Robert W. Krell, Darrell A. Campbell, Jr., Michael J. Englesbe, and Amir A. Ghaferi

In Elderly:

↑ Major Complications

↑ Mortality

↑ Failure to Rescue
Normal Aging

- Muscle strength
- Respiratory Function
- Nutrition
Hospitalization

- Mobilization
- Plasma Volume
- Bone Loss
Deconditioning

- Dehydration
- Delirium
- Fall
- Function status
Frailty

Which life are you designing?
Frailty:

- Osteoporosis
- Weight loss
- Adverse drug reactions
- Cognitive impairment and dementia
- Disability
Finding frailty years early and acting in a timely manner

Evaluating individuals

Reasons for nursing
A syndrome of **Physiological Decline** that affects all organ systems.

- Clinically recognizable state with Increased Vulnerability
- Age-associated declines in physiologic reserve and function across multiple organ systems.
- **Independent of**
  - Age
  - Functional disability
AGING vs FRAILTY

- "Normal aging"
- "Accelerated aging"
- Full performance
- Disability
- Frailty

Performance vs Time (age) with a time-window indicating Frailty.
SARCOPENIA
• Skeletal muscle loss
• Poor muscle quality

Physical Function Impairment
• Weak muscle strength
• Slow gait speed
• Poor balance

FRAILTY
• Deficits accumulation
• Fatigue
• Sedentary behavior
• Weight loss
• Cognitive impairment
• Social isolation
FRAILTY
Reduced Physiological Reserve

Genetics

Environment

Poor nutrition

Dysregulated Hemostasis

Reduced physical activity

Comorbidities

Increasing age

Hospital admission, prolonged hospitalization, slow recovery

Falls, fractures, poor mobility, loss of independence, need for long term care

Procedural complications, poor healing, higher morbidity and mortality

Acute event / illness

Surgery
HOW TO MEASURE FRAILTY?
<table>
<thead>
<tr>
<th>Frailty Tools</th>
<th>Frailty Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRIED’S Index</td>
<td>Changes in everyday activity</td>
</tr>
<tr>
<td></td>
<td>Weight loss</td>
</tr>
<tr>
<td></td>
<td>Exhaustion</td>
</tr>
<tr>
<td></td>
<td>Weakness</td>
</tr>
<tr>
<td></td>
<td>Slowness</td>
</tr>
<tr>
<td></td>
<td>Low physical activity level</td>
</tr>
<tr>
<td></td>
<td>Frailty</td>
</tr>
</tbody>
</table>

**FRAILTY SCORE: OPERATIONALIZATION**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss</td>
<td>Unintentional weight loss ≥10 pounds in the past year.</td>
</tr>
<tr>
<td>Shrinkage</td>
<td>Unintentional weight loss ≥10 pounds in the past year.</td>
</tr>
<tr>
<td>Weakness</td>
<td>Decreased grip strength (Weakness)</td>
</tr>
<tr>
<td>Exhaustion</td>
<td>Self-reported poor stamina</td>
</tr>
<tr>
<td>Low physical activity</td>
<td>Low weekly energy deficit</td>
</tr>
<tr>
<td>Slowness</td>
<td>Slow walking</td>
</tr>
</tbody>
</table>

**Interpretation of the Frailty Score**

The patient receives 1 point for each criterion:

- 0–1 = Not Frail
- 2–3 = Intermediate Frail (Pre-frail)
- 4–5 = Frail

Frail patients are at much higher risk of death.

Intermediate frail patients are at elevated risk at more than double the risk of becoming frail.

See Appendix III for a more detailed description.

**FRAILTY SCORE**

The patient receives one point for each criterion (0–5)

<table>
<thead>
<tr>
<th>Weight loss Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>BMI Kg Force</td>
</tr>
<tr>
<td></td>
<td>24.1–26 ≤29</td>
</tr>
<tr>
<td></td>
<td>26.1–28 ≤30</td>
</tr>
<tr>
<td></td>
<td>≥29</td>
</tr>
<tr>
<td>Women</td>
<td>BMI Kg Force</td>
</tr>
<tr>
<td></td>
<td>23.1–26 ≤17.3</td>
</tr>
<tr>
<td></td>
<td>26.1–29 ≤18</td>
</tr>
<tr>
<td></td>
<td>≥29</td>
</tr>
</tbody>
</table>

**Exhaustion**

For the following two statements:

- "I felt that everything I did was an effort."
- "I could not get going."

The patient is asked: "How often in the last week did you feel this way?"

- 0 = rarely or none of the time (<1 day)
- 1 = some or a little of the time (1–2 days)
- 2 = a moderate amount of the time (3–4 days)
- 3 = most of the time

The criterion is met if patient answers 2 or 3 to either statement.

**Low physical activity**

Weekly energy expenditure, determined with the short version of the Minnesota Leisure Time Activities Questionnaire (see Taylor et al.111) in the lowest 20% percentile by gender:

- Men: <383 kcal/week
- Women: <270 kcal/week

**Slowed walking speed**

Walking speed in the lowest 20% percentile by gender and height. Time is measured for a distance of 15 feet at normal pace. The average of three trials used.

<table>
<thead>
<tr>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>Time</td>
</tr>
<tr>
<td>≤173 cm</td>
<td>≥27 sec</td>
</tr>
<tr>
<td>&gt;173 cm</td>
<td>≥26 sec</td>
</tr>
<tr>
<td>Height</td>
<td>Time</td>
</tr>
<tr>
<td>≤159 cm</td>
<td>≥27 sec</td>
</tr>
<tr>
<td>&gt;159 cm</td>
<td>≥26 sec</td>
</tr>
<tr>
<td>Table 2. Trauma Specific Frailty Index (TSFI)</td>
<td>Table 2. EGS Specific Frailty Index (EGSFI)</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td><strong>Comorbidities</strong></td>
<td><strong>Comorbidities</strong></td>
</tr>
<tr>
<td>Cancer history</td>
<td>Cancer history</td>
</tr>
<tr>
<td>Coronary Heart Disease</td>
<td>YES (1)</td>
</tr>
<tr>
<td>MI (1)</td>
<td>YES (1)</td>
</tr>
<tr>
<td>Medication (0.25)</td>
<td>No (0)</td>
</tr>
<tr>
<td>Dementia</td>
<td>Severe (1)</td>
</tr>
<tr>
<td>No (0)</td>
<td></td>
</tr>
<tr>
<td><strong>Daily Activities</strong></td>
<td><strong>Daily Activities</strong></td>
</tr>
<tr>
<td>Help with grooming</td>
<td>Help with grooming</td>
</tr>
<tr>
<td>Yes (1)</td>
<td>Yes (1)</td>
</tr>
<tr>
<td>Help managing money</td>
<td>Help managing money</td>
</tr>
<tr>
<td>Yes (1)</td>
<td>Yes (1)</td>
</tr>
<tr>
<td>Help doing housework</td>
<td>Help doing housework</td>
</tr>
<tr>
<td>Yes (1)</td>
<td>Yes (1)</td>
</tr>
<tr>
<td>Help toileting</td>
<td>Help toileting</td>
</tr>
<tr>
<td>Yes (1)</td>
<td>Yes (1)</td>
</tr>
<tr>
<td>Help walking</td>
<td>Help walking</td>
</tr>
<tr>
<td>Wheelchair (1)</td>
<td>Wheelchair (1)</td>
</tr>
<tr>
<td>No (0)</td>
<td>Walker (0.75)</td>
</tr>
<tr>
<td><strong>Health Attitude</strong></td>
<td><strong>Health Attitude</strong></td>
</tr>
<tr>
<td>Feel less useful</td>
<td>Feel less useful</td>
</tr>
<tr>
<td>Most time (1)</td>
<td>Most time (1)</td>
</tr>
<tr>
<td>Feel sad</td>
<td>Feel sad</td>
</tr>
<tr>
<td>Most time (1)</td>
<td>Most time (1)</td>
</tr>
<tr>
<td>Feel effort to do everything</td>
<td>Feel effort to do everything</td>
</tr>
<tr>
<td>Most time (1)</td>
<td>Most time (1)</td>
</tr>
<tr>
<td>Within last month (1)</td>
<td>Within last month (1)</td>
</tr>
<tr>
<td>Feel lonely</td>
<td>Feel lonely</td>
</tr>
<tr>
<td>Most time (1)</td>
<td>Most time (1)</td>
</tr>
<tr>
<td><strong>Function</strong></td>
<td><strong>Function</strong></td>
</tr>
<tr>
<td>Sexual active</td>
<td>Sexual active</td>
</tr>
<tr>
<td>Yes (0)</td>
<td>Yes (0)</td>
</tr>
<tr>
<td><strong>Nutrition</strong></td>
<td><strong>Nutrition</strong></td>
</tr>
<tr>
<td>Albumin</td>
<td>Albumin</td>
</tr>
<tr>
<td>&lt;3 (1)</td>
<td>&gt;3 (0)</td>
</tr>
</tbody>
</table>
$R^2 = 0.31, p = 0.1$
Novel Wearable Technology for Assessing Spontaneous Daily Physical Activity and Risk of Falling in Older Adults with Diabetes

Frailty Meter™
A SIMPLE ARM TEST TO ASSESS FRAILTY
Quantitative frailty assessment that does not require walking or self-rated health and activity measures
FRAIL scale

- Fatigue
- Resistance (ability to climb one flight of stairs)
- Ambulation (ability to walk one block)
- Illnesses (Greater than 5)
- Loss of Weight (>5%)

0 = robuste / 1-2 = pre-frail / ≥ 3 = frail
Injury In The Aged: Geriatric Trauma Care at the Crossroads

Rosemary A. Kozar, MD, PhD, Saman Arbabi, MD, MPH, Deborah M. Stein, MD, MPH, Steven R. Shackford, MD, Robert D. Barraco, MD, MPH, Walter L. Biffl, MD, Karen J. Brasel, MD, MPH, Zara Cooper, MD, MSc, Samir M. Fakhry et al/

• **No consensus** on which frailty score is best to use across all clinical settings

• **Scores lack feasibility** → require assessment of up to 30 to 70 variables

• Due to the limitations of current frailty measures → use functional status and sarcopenia as surrogate measures
Prospective Evaluation And Comparison Of The Predictive Ability Of Different Frailty Scores To Predict Outcomes In Geriatric Trauma Patients

Mohammad Hamidi, MD, Muhammad Zeeshan, MD, Terence O'Keeffe, MD, Narong Kulvatunyou, MD, Andrew Tang, MD, Lynn Gries, MD, El-Rasheid Zakaria, MD, Bellal Joseph, MD

- 2-year Prospective
- 341 geriatric trauma patients
- TSFI, mFI, Rockwood Fl, Frail Scale
- Outcomes
  - Predictive ability of each model
Prospective Evaluation And Comparison Of The Predictive Ability Of Different Frailty Scores To Predict Outcomes In Geriatric Trauma Patients

Mohammad Hamidi, MD, Muhammad Zeeshan, MD, Terence O’Keeffe, MD, Narong Kulvatunyou, MD, Andrew Tang, MD, Lynn Gries, MD, El-Rasheid Zakaria, MD, Bellal Joseph, MD

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>TSFI</th>
<th>RFS</th>
<th>mFI</th>
<th>FS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complications</td>
<td>80%</td>
<td>81%</td>
<td>71%</td>
<td>70%</td>
</tr>
<tr>
<td>Mortality</td>
<td>84%</td>
<td>85%</td>
<td>74%</td>
<td>70%</td>
</tr>
<tr>
<td>Rehab/SNF Disposition</td>
<td>84%</td>
<td>82%</td>
<td>65%</td>
<td>61%</td>
</tr>
<tr>
<td>30-d Readmission</td>
<td>75%</td>
<td>76%</td>
<td>61%</td>
<td>60%</td>
</tr>
</tbody>
</table>
THE IMPACT OF SARCOPENIA

NEARLY 25% OF 65+ YEAR OLDS ARE AFFECTED BY SARCOPENIA.

60% OF 80+ YEAR OLDS ARE AFFECTED BY SARCOPENIA.

60 yrs

80 yrs
Can Sarcopenia Quantified by CT Scan Predict Adverse Outcomes in Emergency General Surgery?

Mohammad Hamidi, MD, Cathy Ho, MD, Muhammad Zeeshan, MD, Terence O’Keeffe, MD, Ali Hamza, MD, Narong Kulvatunyou, MD, Faisal Jehan, MD, and Bellal Joseph, MD

Sarcopenia does not predict frailty

• 30d-outcomes
FRAILTY PUBLICATIONS
5631

FRAILTY & SURGERY
595
The Association of Frailty With Outcomes and Resource Use After EGS: A Population-Based Cohort Study

McIsaac, Daniel I. MD, MPH, FRCPC; Moloo, Husein MD, FRCSC, MSc; Bryson, Gregory L. MD, MSc, FRCPC; van Walraven, Carl MD, FRCPC, MSc

Frailty as a Risk Predictor of Morbidity and Mortality Following Liver Surgery

Faiz Gani, Marcelo Cerullo, Neda Amini, Stefan Buettner, Georgios A. Margonis, Kazunari Sasaki, Yuhree Kim,

Frailty, Aging, and Cardiovascular Surgery

Graham, Antonio DO; Brown, Charles H. IV MD, MHS

Comparison of Frailty Measures as Predictors of Outcomes After Orthopedic Surgery
Superiority of Frailty Over Age in Predicting Outcomes Among Geriatric Trauma Patients: A Prospective Analysis
Bellal Joseph, MD, Viraj Pandit, MD, Bardiya Zangbar, MD, Narong Kulvatunyou, MD, Ammar Hashmi, MD, Donald J. Green, MD, Terence O’Keeffe, MB, ChB1, Andrew Tang, MD, Gary Vercruysse, MD, Mindy J. Fain, MD, Randall S. Friese, MD, and Peter Rhee, MD

Frailty Predicts Increased Hospital And 6-month Healthcare Cost Following Colorectal Surgery In Older Adults
Thomas N. Robinson, M.D., F.A.C.S, Daniel S. Wu, M.D, Gregory V. Stiegmann, M.D., F.A.C.S., and Marc Moss, M.D.cMD, MSc

Frailty, Length of Stay, and Mortality in Kidney Transplant Recipients: A National Registry and Prospective Cohort Study
McAdams-DeMarco, Mara A. PhD; King, Elizabeth A. MD; Luo, Xun MD, MPH; Haugen, Christine et al

Assessing Risk of Critical Care Complications and Mortality in the Elective Bariatric Surgery Population Using a Modified Frailty Index
...and I should care, why?
Simple Frailty Score Predicts Postoperative Complications Across Surgical Specialties

Thomas N. Robinson, M.D., F.A.C.S., Daniel S. Wu, M.D., Lauren Pointer, M.S., Christina L. Dunn, B.A., Joseph C. Cleveland Jr., M.D., and Marc Moss

The Impact Of Frailty On Failure-to-rescue In Geriatric EGS Patients: A Prospective Study

2016

Simplified Frailty Index to Predict Adverse Outcomes and Mortality in Vascular Surgery Patients

Joseph Karam, Athanasios Tsiouris, Alexander Shepard, Vic Velanovich, and Ilan Rubinfeld

2013

The Impact Of Frailty On Failure-to-rescue In Geriatric EGS Patients: A Prospective Study

2017
Accumulated Frailty Characteristics Predict Postoperative Discharge Institutionalization in the Geriatric Patient

Thomas N. Robinson, MD, FACS, Jeffrey I. Wallace, MD, Daniel S. Wu, MD, Arek Wiktor, MD et al.

The Association of Frailty With Outcomes and Resource Use After EGS: A Population-Based Cohort Study

McIsaac, Daniel I. MD, MPH, FRCPC; Moloo, Husein MD, FRCSC, MSc; Bryson, Gregory L. Et al

Prospective Evaluation of Delirium in Geriatric Patients Undergoing Emergency General Surgery
Superiority of Frailty Over Age in Predicting Outcomes Among Geriatric Trauma Patients: A Prospective Analysis
Bellal Joseph, MD, Viraj Pandit, MD, Bardiya Zangbar, MD, Narong Kulvatunyou, MD, Ammar Hashmi, MD, Donald J. Green, MD, et al

The Impact Of Frailty On Failure-to-rescue In Geriatric Trauma Patients: A Prospective Study

Preinjury Physical Frailty And Cognitive Impairment Among Geriatric Trauma Patients Determine Post Injury Functional Recovery And Survival
Predicting Hospital Discharge Disposition In Geriatric Trauma Patients: Is Frailty The Answer?
Joseph, Bellal MD; Pandit, Viraj MD; Rhee, Peter MD; Aziz, Hassan MD; Sadoun, Moutamn MD; Wynne, Julie MD et al

Redefining The Association Between Old Age And Poor Outcomes After Trauma: The Impact Of Frailty Syndrome.
Joseph, Bellal MD; Orouji Jokar, Tahereh MD; Hassan, Ahmed MD; Azim, Asad MD; Mohler, Martha Jane PHD, MPH et al
Prospective, Single center study

- 260 EGS Patients

- EGS Specific Frailty Index

- Outcomes:
  - Post-Op complications
  - Mortality

Prospective, Single center study

- 250 Trauma Patients

- Trauma Specific Frailty Index

- Outcomes:
  - In-hospital complications
  - Adverse disposition
FRAILTY & COMPLICATIONS

FRAIL STATUS:

- Higher rates of complications (x2)
- Prolonged hospital length of stay (x3)
- Higher odds of discharge to SNF/LTAC (x2)
- Higher mortality (22% vs 2%)

Age was not a predictor of outcomes when controlled for frailty

Superiority of Frailty Over Age in Predicting Outcomes Among Geriatric Trauma Patients: A Prospective Analysis

Balal Joseph, MD, Viraj Pandit, MD, Bardia Zangbar, MD, Narong Kulatungyoo, MD, Ammar Hashmi, MD, Ronald J. Gearhart, MD, E. Garrett O’Keefe, MB, ChB, Andrew Tang, MD, Gary Vercruysse, MD, Mindy J. Fan, MD, and Sherry MD

Importance: The frailty index (FI) is a known predictor of adverse outcomes in geriatric patients. The usefulness of the FI as an outcome measure in geriatric trauma patients is unknown.

Objective: The present study assessed the performance of the FI as an effective assessment tool in predicting adverse outcomes in geriatric trauma patients.

Design, Setting, and Participants: A 2-year (June 2011 to February 2013) prospective cohort study at a level I trauma center at the University of Arizona. We prospectively included all trauma patients if they were 65 years or older. Patients with FI of 0.25 or higher were defined as those 65 years or older with 3 or more frailty variables. Frailty in patients was defined by an FI of 0.25 or higher.

Main Outcomes and Measures: The primary outcome measure was in-hospital complications. The secondary outcome measure was adverse discharge disposition.

Results: In total, 250 patients were enrolled, with a mean (SD) age of 77.9 (8.1) years, median Injury Severity Score of 15 (range, 9-18), median Glasgow Coma Scale score of 15 (range, 12-15), and mean (SD) 0.21 (0.10). Forty-four percent (n = 111) of patients were frailty. Patients with FI of 0.25 or higher were defined as those 65 years or older with 3 or more frailty variables. Frailty in patients was defined by an FI of 0.25 or higher.

Conclusions and Relevance: The FI is an independent predictor of in-hospital complications and adverse discharge disposition in geriatric trauma patients. This index should be used as a clinical tool for risk stratification in this patient group.
The Impact of Frailty on Outcomes after Trauma in Critically Ill Geriatric Patients Admitted to Intensive Care Unit
Mohammad Hamidi, MD, Terence O’Keeffe, MD, Muhammad Zeeshan, MD, Narong Kulvatunyou, MD, Andrew Tang, MD, Gary Vercruysse, MD, Arpana Jain, MD, and Bellal Joseph, MD

- 5-year retrospective national database analysis
- 88629 geriatric trauma patients admitted to ICU (66% TBI patients).
- Frailty: CSHA-FI 11 variables
- **Outcomes:**
  - Complications
  - Mortality
  - Unfavorable discharge disposition (Rehab/SNF)
FRAILTY IN ICU PATIENTS

Mortality
Complications
Rehab/SNIF discharge

FRAILTY INDEX, FI

RATES, %
FAILURE TO RESCUE (FTR)

> COMPICATIONS!

> FAILURE

< RESCUED
Measure Quality
• Prospective, single center

• 326 EGS patients

• EGS Specific Frailty Index

• Outcomes:
  • Failure to rescue

• Prospective, single center

• 368 trauma patients

• Trauma Specific Frailty Index

• Outcomes:
  • Failure to rescue
FRAIL STATUS:

- Higher rate of FTR
- EGS: 19% vs 4%
- Trauma: 15% vs 5%
- Independent predictor of FTR [OR~3]
Long term outcome

- Eating
- Bathing
- Dressing
- Transferring
- Toileting
- Walking or moving around

Quality of Life
### FRAILTY AND FIM

- **3-y Prospective, single center study**
- **267 trauma patients**
- **TSFI**

#### Outcomes:
- Functional recovery (FIM) (Indicator of patient disability)

<table>
<thead>
<tr>
<th>FIM</th>
<th>Non-Frail</th>
<th>Pre-Frail</th>
<th>Frail</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Admission FIM</strong></td>
<td>11.98 ± 0.14</td>
<td>11.96 ± 0.18</td>
<td>11.81 ± 0.52</td>
<td>0.004</td>
</tr>
<tr>
<td><strong>Discharge FIM</strong></td>
<td>11.20 ± 0.80</td>
<td>11.14 ± 1.51</td>
<td>10.32 ± 2.14</td>
<td>0.002</td>
</tr>
<tr>
<td><strong>Delta FIM</strong></td>
<td>-0.78 ± 0.81</td>
<td>0.82 ± 1.51</td>
<td>-1.48 ± 2.1</td>
<td>0.013</td>
</tr>
</tbody>
</table>
- Prospective, single center study

- 350 trauma patients

**Outcomes:**
- Trauma readmission
- 6 month mortality
- No. of falls
- Recurrent falls

<table>
<thead>
<tr>
<th>Variables</th>
<th>Non-Frail (n=99)</th>
<th>Pre-Frail (n=84)</th>
<th>Frail (n=97)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma readmission</td>
<td>4%</td>
<td>14%</td>
<td>40%</td>
<td>0.01</td>
</tr>
<tr>
<td>Recurrent Falls</td>
<td>5%</td>
<td>13%</td>
<td>65%</td>
<td>0.03</td>
</tr>
<tr>
<td>No. of falls</td>
<td>0[0-1]</td>
<td>0[0-3]</td>
<td>2[0-4]</td>
<td>0.01</td>
</tr>
<tr>
<td>Mortality</td>
<td>1%</td>
<td>3.5%</td>
<td>8.2%</td>
<td>0.04</td>
</tr>
</tbody>
</table>
The Impact Of Frailty On Quality Of Life In The Geriatric Trauma Population: A Prospective Study

Chelsea Santino, MS, Muhammad Zeeshan, MD, Terence O’Keeffe, MD, Mohammad Hamidi, MD, Narong Kulvatunyou, MD, Andrew Tang, MD, Gary Vercruysse, MD, Arpana Jain, MD, and Bellal Joseph, MD

• 1 year prospective, single-center cohort study
• 296 trauma patients
• TSFI
• Short Form 36
• **Outcomes:** Quality of Life at discharge & Quality of Life at 30d after discharge
The Impact Of Frailty On Quality Of Life In The Geriatric Trauma Population: A Prospective Study
Chelsea Santino, MS, Muhammad Zeeshan, MD, Terence O’Keeffe, MD, Mohammad Hamidi, MD, Narong Kulvatunyou, MD, Andrew Tang, MD, Gary Vercruysse, MD, Arpana Jain, MD, and Bellal Joseph, MD

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frail (n=50)</th>
<th>Non-Frail (n=50)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRQoL at discharge, (mean ± SD)</td>
<td>366 ± 81</td>
<td>547 ± 54</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>30-d Post Discharge HRQoL, (mean ± SD)</td>
<td>393 ± 74</td>
<td>743 ± 32</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Delta HRQoL (mean ± SD)</td>
<td>21 ± 16</td>
<td>196 ± 38</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>P-value</td>
<td>0.11</td>
<td>&lt;0.01</td>
<td></td>
</tr>
</tbody>
</table>
EGS Trauma
Frailty
Delirium
Trauma
EGS
Frailty

Geriatric Acute Care Surgery
Now What?!!

MANAGE
THE
DAMAGE
GERIATRIC TRAUMA OPTIMIZATION
GERIATRIC SPECIFIC EDs

Geriatric Emergency Department Accreditation Program
GEDA was developed by leaders in emergency medicine to ensure that our older patients receive well-coordinated, quality care at the appropriate level at every ED encounter.

Level 3 accreditation signifies excellence in older adult care as represented by one or more geriatric-specific initiatives that are reasonably expected to elevate the level of elder care in one or more specific areas.

Level 2 accreditation identifies sites that have integrated and sustained older adult care initiatives into daily operations.

Level 1 accreditation defines an ED with policies, guidelines, procedures, and staff (both within the ED and throughout the institution) providing a coherent system of care targeting and measuring specific ED outcomes for older adults.
GERIATRIC SPECIFIC EDs

• Began appearing in the US in 2008 and have become increasingly common

• **Multi-disciplinary team** of care providers focused on the needs of the geriatric population

• **Staffing enhancements**: availability of
  
  • Specialized nurses
  • Specialized Pharmacists
  • Social workers
  • Geriatric consultation services in the ED
GERIATRIC SPECIFIC EDs

• Main goals \(\rightarrow\) ↓ hospital admissions

• **Discharge protocols**: facilitate communication with outpatient care providers

• Provides **appropriate outpatient follow up** (telephone/telemedicine)

• **Geriatric Program Quality Improvement Plan**
  • Geriatric volume
  • Admission and readmission rates
MANAGEMENT PLAN

PREVENTION

Triage  Assessment  In-hospital management
PREVENTION

Fall Prevention
- Gait, and balance check
- Medication modification
- Exercise program
- Home modification
- Avoid polypharmacy

60% ↓ in Falls

MVC Prevention
- Graduated exercise programs
- Driving simulations
- Video based training
TRIAGE
Are Trauma Systems Designed for Geriatric Injuries?
Unconscious Age Bias:
Older adults, especially women, are **less likely to receive care** at trauma centers
Older Adults are Under-Triaged
Lethal: 2-fold ↑ mortality
Elderly Trauma Patient (≥ 65 years old)

No

Initial evaluation and Supportive care at closest appropriate medical center

Pre-existing conditions or severe injuries present?

Yes

Consider early referral to designated/verified Trauma Center

Assess Prothrombin time (INR) & begin correcting coagulopathy due to therapeutic anticoagulation.

(Fresh frozen plasma/Vit. K should be administered within 2 hours of injury, consider expedient computed tomography of the brain)

Age ≥ 70
GCS < 15
Base deficit ≤ -6
or
Severe anatomic injury present

No

Supportive care

No

Consider early trauma activation and ICU admission

Persistently low (GCS ≤ 8) > 72 hours despite paucity of sedation?

Consider limiting further aggressive interventions

Practice Management Guideline
Increased Trauma Activation Is Not Equally Beneficial For All Elderly Trauma Patients

Carr, Bryan W., MD; Hammer, Peter M., MD; Timsina, Lava, PhD, MPH; Rozycki, Grace, MD, MBA; Feliciano, David V., MD; Coleman, Jamie J., MD

• ↑ Trauma activation was proposed to improve outcomes vs. increased cost and stress to the hospital system

• What is the age at which an increase in activation status is beneficial?

• Policy change ↑ the activation criteria to the highest level for patients >70y
Increased Trauma Activation Is Not Equally Beneficial For All Elderly Trauma Patients
Carr, Bryan W., MD; Hammer, Peter M., MD; Timsina, Lava, PhD, MPH; Rozycki, Grace, MD, MBA; Feliciano, David V., MD; Coleman, Jamie J., MD

- Patients who presented prior to policy changes (PRE) were compared with those after the change (POST)
- Mortality and LOS were ↓ in patients in the POST group who are >77y
  - There is benefit with ↓ cost
TRAUMA TEAM ACTIVATION

- Lower Threshold for Trauma Team Activation in Elderly patients
- Own activation Team

- Advanced AGE is not an absolute predictor of poor outcomes should not be used
- Aggressive Care
- Shock Index Will help in Triage Protocol
Geriatric Trauma:

- **Primary survey:** No difference

- Secondary survey
  - Determine medications that affect initial evaluation
    - Anticoagulants
    - Antiplatelet
    - Beta blocker
    - ACE Inhibitors

- Identify disease that complicate patient’s presentation
  - MI
  - Pneumonia
  - CVA
  - Hypovolemia
RESUCITATION

• Adopt moderate resuscitation approaches

• High volume resuscitation ($\geq 1.5\ L$) → high risk for mortality

• When required consider
  • ICU admission
  • Operative intervention
Massive Blood Transfusions Post Trauma In The Elderly Compared To Younger Patients
Biswa Dev Mitra, Alexander Olaussen, Peter A. Cameron, Tom O'Donohoe, Mark Fitzgerald

- 311 patients receiving massive transfusion post trauma
- Aim: investigate mortality of elderly patients and explore variables associated with poor outcomes
- Stratification >65 y and <65 y
Massive Blood Transfusions Post Trauma In The Elderly Compared To Younger Patients

Biswadev Mitra, Alexander Olaussen, Peter A. Cameron, Tom O’Donohoe, Mark Fitzgerald

- Predictors of mortality
  - Acute traumatic coagulopathy (OR 11.75 p=0.02)
  - Age (OR 1.18 p=0.06)
Improving Survival After an Emergency Resuscitative Thoracotomy: A 5-year Review of the Trauma Quality Improvement Program

Bellal Joseph, Muhammad Khan, Faisal Jehan, Rifat Latifi, Peter Rhee

- A 5-year (2010-2014) retrospective analysis of ACS-TQIP
- 2,229 patients underwent ERT
- Overall survival rate was 9.6%
- Outcomes: ERT utilization rate & survival trends

No patient ≥ 60 y with a blunt MOI survived
No patient ≥ 70 y regardless of MOI survived
Mortality After Trauma Laparotomy In Geriatric Patients
Bellal Joseph, Bardiya Zangbar, Viraj Pandit, Narong Kulvatunyou, Lynn Gries, Randall S. Friese, Peter Rhee

- 6-year retrospective analysis, all trauma patients undergoing a laparotomy
- Age ≥55 y who underwent a trauma laparotomy

Outcomes: Mortality & Predictors of mortality
Predictors of Mortality

- Age
- Admission lactate

Fig – Mortality stratified by age.
Specialized Inpatient Care

• Pain management
• Consult geriatrician
• CGA
• Frailty
PAIN MANAGEMENT

• Assessment of pain severity

• Multimodal approach to pain
  • Regional anesthesia
  • PCA
  • Nerve blocks

• Careful utilization of opioids
  • Bowel stimulating laxatives

• NSAIDs
  • PUD
  • Anticoagulation
PAIN MANAGEMENT
Decreased Risk of Delirium With Use of Regional Analgesia in Geriatric Trauma Patients With Multiple Rib Fractures

O'Connell, Kathleen M., MD, MPH; Quistberg, D. Alex, PhD, MPH; Tessler, Robert, MD; Robinson, Bryce R. H., MD, MS; Cuschieri, Joseph, MD; Maier, Ronald V., MD; Rivara, Frederick P., MD, MPH; Vavilala, Monica S., MD; Bhalla, Paul I., MD; Arbabi, Saman, MD, MPH

• Retrospective study
• 144 patients ≥65y with ≥3 rib fractures, and admission to ICU

Outcome: delirium positive ICU days
Risk of delirium ↓ by 24% per day per patient after regional anesthesia
Individual opioid use ↓ after regional anesthesia
An Evaluation of a Proactive Geriatric Trauma Consultation Service

Lenartowicz, Magda MD*; Parkovnick, Meredith MSc†; McFarlan, Amanda BA†; Haas, Barbara MD‡; Straus, Sharon E. MD, MSc§; Nathens, Avery B. MD, PhD, MPH‖; Wong, Camilla L. MD

• 2 year prospective analysis

• 486 geriatric trauma patient

• Intervention: geriatric trauma consultation

• Outcome measures Complications & Mortality
Geriatric trauma consultation:

- Clinical nurse specialist
- Geriatrician
- Communication of recommendations
- Weekly interdisciplinary meetings with the trauma team
- Measurement of quality indicators.

↓ 10% delirium

↓ 5% SNF discharge

Issue addressed:

- Sensory impairment
- Pain
Comprehensive Geriatric Assessment:

- 10% ↓ in delirium
- 36% ↓ in falls
- 4 days ↓ in hospital stay
- 13% ↑ in ADL
<table>
<thead>
<tr>
<th></th>
<th>Comorbidities</th>
<th>Daily Activities</th>
<th>Health Attitude</th>
<th>Function</th>
<th>Nutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer history</td>
<td>YES (1)</td>
<td>No (0)</td>
<td>No (0)</td>
<td>Sexual active: No (1)</td>
<td>Nutrition: Albumin: &lt;3 (1)</td>
</tr>
<tr>
<td>MI (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coronary Heart Disease</td>
<td>MI (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication (0.25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CABG (0.75)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCI (0.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dementia</td>
<td>Severe (1)</td>
<td>No (0)</td>
<td>Walker (0.75)</td>
<td>No (0)</td>
<td>Albumin: &lt;3 (1)</td>
</tr>
<tr>
<td></td>
<td>No (0)</td>
<td></td>
<td>Cane (0.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help with grooming</td>
<td>Yes (1)</td>
<td>No (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help managing money</td>
<td>Yes (1)</td>
<td>No (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help doing housework</td>
<td>Yes (1)</td>
<td>No (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help toileting</td>
<td>Yes (1)</td>
<td>No (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help walking</td>
<td>Wheelchair (1)</td>
<td>Walker (0.75)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No (0)</td>
<td>Cane (0.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feel less useful</td>
<td>Most time (1)</td>
<td>Sometimes (0.5)</td>
<td>Never (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feel sad</td>
<td>Most time (1)</td>
<td>Sometimes (0.5)</td>
<td>Never (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feel effort to do everything</td>
<td>Most time (1)</td>
<td>Sometimes (0.5)</td>
<td>Never (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Falls</td>
<td>Within last month (1)</td>
<td>Present not in last month (0.5)</td>
<td>None (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feel lonely</td>
<td>Most time (1)</td>
<td>Sometimes (0.5)</td>
<td>Never (0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If limited resources

- **Use:** Trauma Specific Frailty Index

**ISAR screening questions**
1. Before the illness or injury that brought you to the Emergency Department, did you need someone to help you on a regular basis? [Yes/No]
2. Since the illness or injury that brought you to the Emergency Department, have you needed more help than usual to take care of yourself? [Yes/No]
3. Have you been hospitalized for one or more nights during the past six months (excluding a stay in the Emergency Department)? [Yes/No]
4. In general, do you see well? [Yes/No]
5. In general, do you have serious problems with your memory? [Yes/No]
6. Do you take more than three different medications every day? [Yes/No]

**Score of 2 or more**

**Obtain Geriatric Consultation**
Plan early mobilization

Establish PMHx:
• Communicate with family and PCP
• Document complete medication list.

Avoid polypharmacy

Effective pain management:
• Improve pulmonary functions
• Optimize mobility
• Mitigate delirium

INPATIENT CARE
INPATIENT CARE

Delirium in the ICU: What About the Floor?
Cahill, Anthony MD; Pearcy, Christopher MD; Agrawal, Vaidehi PhD; Sladek, Phillip MD; Truitt, Michael S. MD

Don’t Call Me Crazy! Delirium Occurs Outside of the Intensive Care Unit
Cahill, Anthony MD; Pearcy, Christopher MD; Almahmoud, Khalid MD; Agrawal, Vaidehi PhD; Mani, Usha MD; Sladek, Phillip MD; Truitt, Michael S. MD
INPATIENT CARE

• 14-56 % of all hospitalized elderly patients
• 70-87% of all elderly in ICU
  • Mortality: 22-76%
• Increases cost by $2,500/patient
• Annual expenditures: $7 billion.
## INPATIENT CARE

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Consultation (n=62)</th>
<th>Standard (n=65)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium</td>
<td>32%</td>
<td>50%</td>
<td>0.04</td>
</tr>
<tr>
<td>Severe delirium</td>
<td>12%</td>
<td>29%</td>
<td>0.02</td>
</tr>
<tr>
<td>Hospital stay,</td>
<td>5 ± 2</td>
<td>5 ± 2</td>
<td>0.72</td>
</tr>
<tr>
<td>Rehab/SNF Disposition</td>
<td>92%</td>
<td>88%</td>
<td>0.41</td>
</tr>
<tr>
<td>Delirium at discharge</td>
<td>13%</td>
<td>19%</td>
<td>0.35</td>
</tr>
</tbody>
</table>
MANAGING EGS
Pre-operative care

In-hospital management

Discharge planning
RECOMMENDATIONS

• Use realistic risk prediction tools
Geriatric Patient

High Risk
- Can not Delay Treatment

Can Delay Treatment

Low Risk
- Surgery
<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Non-surgical options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diveritiular/appendix abcess</td>
<td>Radiological drainage</td>
</tr>
<tr>
<td>Nongangrenous mesenteric ischemia</td>
<td>Anticoagulation, Interventional radiology</td>
</tr>
<tr>
<td>Severe cholecystitis</td>
<td>Radiological drainage, “cholecystostomy”</td>
</tr>
<tr>
<td>Bleeding duodenal ulcer</td>
<td>Endoscopic hemostasis, Selective IR emolization</td>
</tr>
<tr>
<td>Obstructing colorectal cancer</td>
<td>Endoluminal stenting</td>
</tr>
<tr>
<td>Sigmoid volulus</td>
<td>Rigid or flexible endoscopic decompression</td>
</tr>
</tbody>
</table>
Geriatric Patient

High Risk
- Can not Delay Treatment

Low Risk
- Can Delay Treatment
- Surgery
Prehabilitation

• Enhancing functional capacity
• Withstand the stressor of surgery

Intention

The fitter they are, the quicker they will recover.
Assessing Decision Making Capacity

Determine whether or not the patient has decision-making capacity

- **Able to communicate** a choice
- **Understand** the relevant information
- **Appreciate** the situation and its consequences
- **Reason** about treatment options
Preoperative Assessment

In addition to conducting a complete and thorough history and physical examination, the following assessments are strongly recommended:

- Assess the patient’s cognitive ability and capacity to understand the postoperative delirium (see Section I.D).
- Screen for alcohol and other substance abuse/dependence (see Section I.E).
- Perform a preoperative cardiac evaluation according to the American Heart Association (ACCA) algorithm for cardiac surgery (see Section II and Appendix II).
- Identify and consider appropriate perioperative adjustments. Monitor for polypharmacy (see Sections VII and VIII.Appendix VI and Appendix VII).
- Determine plaintiff’s nutritional status and consider preoperative interventions (see Section VI and Appendix IV).
- Document functional status and history of falls (see Section IV).
- Determine baseline frailty score (see Section V and Appendix III).
- Assess patient’s treatment goals and expectations in the context of the possible treatment outcomes (see Section VIII).
- Determine patient’s family and social support systems (see Section VIII).

Patient Goals, Preferences, and Advance Directives

Personal goals and treatment preferences should be addressed prior to surgery.

Discuss:

- Postoperative functional decline
- Loss of independence
- Skilled care burden
- Advance directive and a designated health care proxy
Medication Management

- **Review** all medications including **OTC and herbal products**
- **Discontinue** medications with risk of **adverse reaction**
- **Adequately control pain**
- **Appropriate reversal of anticoagulation**
Intraoperative Management

**Anesthetic Approach**
- Elderly Considerations
- Techniques

**Perioperative Analgesic Plan**
- Opioid-Sparing Techniques
- Regional Techniques

**Perioperative Nausea & Vomiting**
- Risk stratification

**Patient Safety**
- Pressure Ulcers / Nerve Damage
- VTE Prophylaxis

**Fluid management**
- IV Fluids considerations

**Hypothermia and Pulmonary Complications**
- Prevention Strategies
• A directed pain history and physical examination

• Multimodal approach
  
  • Scheduled acetaminophen > regional blocks > epidural
  
  • Appropriately titrate to patient needs
  
  • Give prophylactic pharmacological bowel regimen
    - Stool softeners + Stimulant Laxatives

• Follow Beers Criteria (Benzos, barbiturates, non-cox NSAIDs...)
Multidisciplinary approach
## Postoperative Rounding Checklist

<table>
<thead>
<tr>
<th>Daily Evaluation For</th>
<th>Prevention/Management Strategies</th>
</tr>
</thead>
</table>
| Delirium/cognitive impairment | • Pain control  
|                      | • Optimize physical environment (for example, sleep hygiene, sleep protocol, minimize tethers, encourage family at bedside)  
|                      | • Vision and hearing aids accessible |
| Perioperative acute pain* | • Resume diet as early as feasible  
| Functional decline | • Dentures made available  
|                      | • Supplementation if indicated |
| Pulmonary complications | • Daily documentation of Foley catheter indication  
|                      | • Catheter care bundles, hand hygiene, barrier precautions  
| Pressure ulcers | • Care models and pathways  
|                      | • Structural: uncluttered hallways, large clocks and calendars  
|                      | • Multidisciplinary rounds  
|                      | • Early mobilization and/or PT/OT  
|                      | • Family participation  
|                      | • Nutritional support  
|                      | • Minimize patient tethers  
|                      | • Reduce/minimize pressure, friction, humidity, shear force  
|                      | • Maintain adequate nutrition  
|                      | • Wound care |
Frailty screening and a Frailty Pathway Decrease Length of stay, Loss of Independence, and 30-day Readmission rates in Frail Geriatric Trauma and Emergency General Surgery Patients

Kathryn E. Engelhardt, MD, Quentin Reuter, MD, Jessica Liu, MD, Jonathan F. Bean, MD, Joliette Barnum, MD, Michael B. Shapiro, MD, Allison Ambre, DPT, Amanda Dunbar, Mara Markzon, Tara N. Reddy, MD, Christine Schilling, MFS, and Joseph A. Posluszny, Jr.

- Prospective (before-after) study

- 70 frail patients (11 before vs 59 after intervention)

- **Intervention:** novel frailty pathway

- **Outcomes:** LOS & 30-day readmission rate
Patient admitted to Trauma or Emergency General Surgery Service

Primary Assessment

- Patient >65

Frailty Index Measured

Frail

Frailty Intervention

- Use of specialized orderset
- Hospitalist consult
- Early family engagement on LOS and discharge disposition
- Palliative care consult when appropriate
- Expedited SW and PT/OT evaluation

Frailty Follow-up

- 3 day phone call after discharge
- 7 day follow-up appointment after discharge

Outcome Metrics

1. Hospital Length of stay
2. 30 day Readmissions
<table>
<thead>
<tr>
<th>Measure/Outcome</th>
<th>Before Intervention n = 11 (%)</th>
<th>After Intervention n = 59 (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalist consult</td>
<td>27%</td>
<td>98%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Documented discussion of expectations</td>
<td>18%</td>
<td>96%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Length of stay, median [IQR]</td>
<td>9 [3-14]</td>
<td>6 [3-12]</td>
<td>0.40</td>
</tr>
<tr>
<td>30-day readmission</td>
<td>4 (36.4)</td>
<td>6 (10.2)</td>
<td>0.04</td>
</tr>
</tbody>
</table>
Preop:
- Patient education (1C)
- Carb loading (2B) / Clear liquids until 2hrs prior (1A)
- Mechanical *oral* bowel prep (2B)
- Optimize comorbidity (2B)

Intraop:
- Preset orders (2C)
- SSI bundle: abx / prep (1B)
- Pre-emptive, multimodal pain control (1B)
- Restrictive / goal directed fluid use (1B)
- Laparoscopic approach (1A)

Postop:
- Early feeding, heprop (1B)
- Multimodal pain regimen (1B)
- Early foley removal / ambulation (1B)
- No drains (1B)
High Compliance to an Enhanced Recovery Pathway for Patients ≥65 Years Undergoing Major Small and Large Intestinal Surgery Is Associated With Improved Postoperative Outcomes

Oluwafemi P. Owodunni, MD, MPH, Jessica Hampton, MS, Dianne Bettick, MSN, CNS, RN, Sara Sateri, MD, Thomas Magnuson

<table>
<thead>
<tr>
<th>Table 1: ERP in Perioperative Care</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preoperative Variables</strong></td>
</tr>
<tr>
<td>1. Preadmission counselling</td>
</tr>
<tr>
<td>2. Prevention of Insulin Resistance</td>
</tr>
<tr>
<td>3. Prevention of postoperative nausea/vomiting</td>
</tr>
<tr>
<td>4. Use of regional anesthetic</td>
</tr>
<tr>
<td>5. Intraoperative temperature control</td>
</tr>
<tr>
<td>6. Intraoperative fluid management</td>
</tr>
<tr>
<td>7. Multimodal analgesia</td>
</tr>
<tr>
<td><strong>Definition of Variables</strong></td>
</tr>
<tr>
<td>Shared educational book and online</td>
</tr>
<tr>
<td>EMRI module on enhanced recovery after gastrointestinal surgery</td>
</tr>
<tr>
<td>Clear liquid carbohydrate drink (Gatorade) consumption between midnight and 3h prior to induction of anesthesia</td>
</tr>
<tr>
<td>Documented screening for risk factors for postoperative nausea or vomiting. Risk factors include: female, nonsmoking, history of motion sickness, history of postoperative nausea and vomiting, and preoperative, intraoperative opioid. Preoperative placement of a scopolamine patch + ≥ 1 intraoperative IV antiemetic.</td>
</tr>
<tr>
<td>The use of a thoracic epidural placed preoperatively for all open cases with continuous epidural infusion of bupivacaine unless contraindicated. Alternatively, a TAP block can be performed preoperatively for laparoscopic cases unless contraindicated. If regional anesthetic is contraindicated, intravenous intravenous lidocaine infusion may be used.</td>
</tr>
<tr>
<td>Intraoperative temperature &gt; = 36°C/96.8°F and on admission to the PACU. Goal-directed fluid therapy monitored by Edwards ClearSight hemodynamic monitoring and/or case volume = 3 mL/kg per hour of intravenous crystalloid and colloid fluid.</td>
</tr>
<tr>
<td>Preoperative administration of Gabapentin, Acetaminophen and Celebrex. Use of Lidocaine dermal patches 24h after TAP block in laparoscopic procedures. Use of intravenous and oral NSAIDs postoperatively. Use of intravenous Acetaminophen postoperatively.</td>
</tr>
<tr>
<td>If epidural in place, continuous epidural infusion of Bupivacaine + low dose Fentanyl. Recording of POD pain controlled with oral pain medication: First date on which pain is adequately controlled with oral pain medications alone for 24h. The patient should be able to ambulate (unless unable preoperatively) without significant pain (significant pain is a score &gt; 4 on a scale from 0 to 10).</td>
</tr>
<tr>
<td>Ambulation occurred any length of time within the POD 0 given time</td>
</tr>
<tr>
<td>Ambulation occurred twice during this time period. Standing at bedside not included.</td>
</tr>
<tr>
<td>Ambulation occurred twice during this time period. Standing at bedside not included.</td>
</tr>
<tr>
<td>Clear liquid diet ordered POD #0. Return of bowel function recorded in EMR as date bowel movement or flatus passed.</td>
</tr>
<tr>
<td>Solid diet was ordered POD #1. Date tolerating diet recorded as first date patient could tolerate 1 solid meal and drink 800 cc or more of a liquid diet without need for IV fluids and no signs of nausea/vomiting, or abdominal pain. Solid meal indicates not puree food.</td>
</tr>
<tr>
<td>Maintenance IVF discontinued (anything 42 cc or more) POD #0, fluid bolts allowed</td>
</tr>
<tr>
<td>Foley catheter removed POD #1 unless indicated patient was high risk (history of BPH, prostate surgery, bladder injury, extensive pelvic surgery or history of postoperative urinary retention).</td>
</tr>
</tbody>
</table>

- 4 years analysis 2013-2017, 281 Geriatric patients undergoing major intestinal injuries
- Analysis: Pre ERP vs Post-ERP
- Outcomes: LOS, Complications, Readmissions
High Compliance to an Enhanced Recovery Pathway for Patients ≥65 Years Undergoing Major Small and Large Intestinal Surgery Is Associated With Improved Postoperative Outcomes

Oluwafemi P. Owodunni, MD, MPH, Jessica Hampton, MS, Dianne Bettick, MSN, CNS, RN, Sara Sateri, MD, Thomas Magnuson, MD, Elizabeth ERP:

- Shorter h-LOS (OR: 0.7[0.6-0.9]) 30% decrease
- Lower complications (OR: 0.4[0.1-1.0]) 60% decrease
- No effect on readmissions
Pre-operative care

In-hospital management

Discharge planning
CARE TRANSITIONS MODELS

TRANSITIONAL CARE MODEL

- Hospital
- Skilled Nursing Facility
- Rehabilitation Center
- Home

Boston University School of Medicine
Transition of Care

Coordinated care, particularly with primary care physician

Engagement of patient, family, and/or caregiver

Post-discharge follow up plan

Consistent communication
PALLIATIVE CARE

Promotes quality of life
Treats the whole person
Supports the family
Is an “extra layer of support” for all

HOSPICE & PALLIATIVE CARE
High Burden of Palliative Care Needs of Older Adults During Emergency Major Abdominal Surgery

Zara Cooper, MD, MSc, Elizabeth J. Lilley, MD, MPH, Evan Bollens-Lund, MA, Susan L. Mitchell, MD, Christine S. Ritchie, MD, MSPH, Stuart R. Lipstiz, ScD, Amy S. Kelley, MD,

- Retrospective study

- 411 elderly patients undergoing emergency major abdominal surgery

- **Aim:** Quantify preoperative illness burden, examine its association with outcomes, and describe end-of-life care
2/3rd of these individuals were potential candidates for palliative care.
Retrospective cohort study (2000-2013)

Aim: Validate a prognosis calculator → geriatric trauma outcome score II (GTOS II)
- Estimate probability of unfavorable discharge
- 16,114 trauma patients >65y surviving to discharge
- Outcomes: gastrostomy, tracheostomy placement, and enrollment in hospice

Primary Sample (n = 16,114)

Score Creation Sample (n = 8,057)
Score Validation Sample (n = 942)
• 310 surgery patients who underwent palliative care consultations (160 before frailty screening, 150 after)

• **Intervention:** Surgical palliative care consultations, including frailty screening

• **Primary Outcomes:** 30-, 180-, and 360-day mortality
Take Home Message:

1. You Must Calculate Frailty
2. Use Objective Data for Conversations

- Increased rate of palliative care consultations (30%)
Emergency General Surgery in Geriatric Patients: A Statewide Analysis of Surgeon and Hospital Volume With Outcomes

Mehta, Ambar MPH; Dultz, Linda A. MD, MPH; Joseph, Bellal MD; Canner, Joseph K. MHS; Stevens, Kent MD, MPH; Jones, Christian MD, MS; Haut, Elliott R. MD, PhD; Efron, David T. MD; Sakran, Joseph V. MD, MPH, MPA

- Surgeons performing ≤8 procedures annually:
  - 86% higher odds of death
  - 74% higher odds of FTR

FUTURE Directions

• Geriatric specific centers?
• Dedicated geriatric surgical training?

Surgeon volume is predictor; NOT the hospital volume
Thank You!

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