FRAILTY in Critical Illness

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Critical Care Canada Forum
October 30, 2012
Objectives

• Discuss the Concept of “Frailty”?
• Discuss How We Measure “Frailty”?
• Discuss Frailty in Older Persons
• Discuss Frailty and Surgery
• Discuss Frailty and Critical Illness
What is Frailty?

Multidimensional syndrome related to aging described in older patients

Characterized by:
loss of reserve
accumulation of deficits
individually reversible but collectively insurmountable

Effect:
vulnerability to adverse events
Vicious Cycle of Frailty

Chronic undernutrition

Age
Malnutrition
Diseases
Environment

Decreased
energy expenditure

Decreased physical activity

Decreased metabolic rate

Dysregulation
Hormonal
Inflammation
Coagulation

Insulin resistance
Osteopenia
Decreased VO$_2$ max

Sarcopenia

Frailty
Avalanche of Frailty

Accumulation of deficits

Failure to withstand environmental stress

Diminished repertoire of homeostatic responses

“Physiologic Reserve”
FRAILTY and FUNCTION

External Stressor

Maximal Function

Independent

Dependent

Functional Reserve

Unable to fully compensate

Quinlan et al J Am Soc Ger 2011
Frailty, Disability and Comorbidity

Disability
Functional limitations resulting from impairments

Comorbidity
Disease processes resulting from biology and exposures

Frailty
Increased vulnerability to disease and accidents

CHS Totals (n=2,762):
Comorbidity – 2,576 (93%)
Disability – 363 (13.1%)
Frailty – 368 (13.3%)

Fried et al J Gerontol 2004
Changes in relative fitness and frailty across the adult lifespan: evidence from the Canadian National Population Health Survey

Kenneth Rockwood MD, Xiaowei Song PhD, Arnold Mitnitski PhD

Frailty Index ~ constructed by 42 self-reported variables
Changes in relative fitness and frailty across the adult lifespan: evidence from the Canadian National Population Health Survey

Kenneth Rockwood MD, Xiaowei Song PhD, Arnold Mitnitski PhD

All Ages (>15 years)

Aged > 70 years

Most FRAIL ~ Frailty Index > 0.21
Outcome instruments to measure frailty: A systematic review

N.M. de Vries, J.B. Staal, C.D. van Ravensberg, J.S.M. Hobbelin, M.G.M. Olde Rikkert, M.W.G. Nijhuis-van der Sanden

- ~ 8 domains to assess frailty
- 20 different frailty instruments + scoring systems

<table>
<thead>
<tr>
<th>Frailty factor</th>
<th>Operationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutritional status</td>
<td>- Body weight</td>
</tr>
<tr>
<td></td>
<td>- Appetite</td>
</tr>
<tr>
<td></td>
<td>- Body Mass Index (BMI)</td>
</tr>
<tr>
<td>Physical activity</td>
<td>- Leisure time physical (group) activity</td>
</tr>
<tr>
<td></td>
<td>- Difficulty or needing help walking/moving in and around the house</td>
</tr>
<tr>
<td>Mobility</td>
<td>- Gait speed</td>
</tr>
<tr>
<td></td>
<td>- Tiredness</td>
</tr>
<tr>
<td></td>
<td>- Energy level (for example exhaustion/fatigue)</td>
</tr>
<tr>
<td>Energy</td>
<td>- Lifting an object that weighs over 5 kg</td>
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<tr>
<td></td>
<td>- Weakness in arms and/or legs</td>
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<td></td>
<td>- Performing chair stands</td>
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<tr>
<td></td>
<td>- Climbing stairs</td>
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<tr>
<td></td>
<td>- Grip strength</td>
</tr>
<tr>
<td></td>
<td>- Calf muscle circumference</td>
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<tr>
<td>Cognition</td>
<td>- Memory problems</td>
</tr>
<tr>
<td></td>
<td>- Diagnosed dementia or cognitive impairment</td>
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<tr>
<td>Mood</td>
<td>- Depression/depressed mood</td>
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<tr>
<td></td>
<td>- Sadness</td>
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<tr>
<td></td>
<td>- Anxiety</td>
</tr>
<tr>
<td></td>
<td>- Nervousness</td>
</tr>
<tr>
<td>Social relations/social support</td>
<td>- Social recourses (when help is needed, can someone provide this?)</td>
</tr>
<tr>
<td></td>
<td>- Emptiness/missing people around</td>
</tr>
</tbody>
</table>
Frail Phenotype (Fried)

- Shrinking (unintended weight loss ~ 10 lb)
- Decreased grip strength
- Self-reported exhaustion
- Slow walking speed
- Low physical activity

≥ 3 Frail
1-2 Intermediate
0 Not frail
CSHA Frailty Index

- Changes in everyday activities
- Head and neck problems
- Poor muscle tone in neck
- Bradykinesia, facial
- Problems getting dressed
- Problems with bathing
- Problems carrying out personal grooming
- Urinary incontinence
- Toileting problems
- Bulk difficulties
- Rectal problems
- Gastrointestinal problems
- Problems cooking
- Sucking problems
- Problems going out alone
- Impaired mobility
- Musculoskeletal problems
- Bradykinesia of the limbs
- Poor muscle tone in limbs
- Poor limb coordination
- Poor coordination, trunk
- Poor standing posture
- Irregular gait pattern
- Falls

- Mood problems
- Feeling sad, blue, depressed
- History of depressed mood
- Tiredness all the time
- Depression (clinical impression)
- Sleep changes
- Restlessness
- Memory changes
- Short-term memory impairment
- Long-term memory impairment
- Changes in general mental functioning
- Onset of cognitive symptoms
- Clouding or delirium
- Paranoid features
- History relevant to cognitive impairment or loss
- Family history relevant to cognitive impairment or loss
- Impaired vibration
- Tremor at rest
- Postural tremor
- Intention tremor
- History of Parkinson’s disease
- Family history of degenerative disease

- Seizures, partial complex
- Seizures, generalized
- Syncope or blackouts
- Headache
- Cerebrovascular problems
- History of stroke
- History of diabetes mellitus
- Arterial hypertension
- Peripheral pulses
- Cardiac problems
- Myocardial infarction
- Arrhythmia
- Congestive heart failure
- Lung problems
- Respiratory problems
- History of thyroid disease
- Thyroid problems
- Skin problems
- Malignant disease
- Breast problems
- Abdominal problems
- Presence of snout reflex
- Presence of the palmmental reflex
- Other medical history
A global clinical measure of fitness and frailty in elderly people

Kenneth Rockwood, Xiaowei Song, Chris MacKnight, Howard Bergman, David B. Hogan, Ian McDowell, Arnold Mitnitski

Abstract

Background: There is no single generally accepted clinical definition of frailty. Previously developed tools to assess frailty that have been shown to be predictive of death or need for entry into an institutional facility have not gained acceptance among practicing clinicians. We aimed to develop a tool that would be both predictive and easy to use.

Methods: We developed the 7-point Clinical Frailty Scale and applied it and other established tools that measure frailty to 2305 elderly patients who participated in the second stage of the Canadian Study of Health and Aging (CSHA). We followed this cohort prospectively; after 5 years, we determined the ability of the Clinical Frailty Scale to predict death or need for institutional care, and correlated the results with those obtained from other established tools.

Results: The CSHA Clinical Frailty Scale was highly correlated (r = 0.80) with the Frailty Index. Each 1-category increment of our scale significantly increased the medium-term risks of death (21.2% within about 70 mo, 95% confidence interval [CI] 12.5%–30.6%) and entry into an institution (23.9%, 95% CI 8.8%–41.2%) in multivariable models that adjusted for age, sex and education. Analyses of receiver operating characteristic curves showed that our Clinical Frailty Scale performed better than measures of cognition, function or comorbidity in assessing risk for death (area under the curve 0.77 for 18-month and 0.70 for 70-month mortality).

Interpretation: Frailty is a valid and clinically important construct that is recognizable by physicians. Clinical judgments about frailty can yield useful predictive information.

Box 1: The CSHA Clinical Frailty Scale

1 Very fit — robust, active, energetic, well motivated and fit; these people commonly exercise regularly and are in the most fit group for their age
2 Well — without active disease, but less fit than people in category 1
3 Well, with treated comorbid disease — disease symptoms are well controlled compared with those in category 4
4 Apparently vulnerable — although not frankly dependent, these people commonly complain of being “slowed up” or have disease symptoms
5 Mildly frail — with limited dependence on others for instrumental activities of daily living
6 Moderately frail — help is needed with both instrumental and non-instrumental activities of daily living
7 Severely frail — completely dependent on others for the activities of daily living, or terminally ill

Note: CSHA = Canadian Study of Health and Aging.
A global clinical measure of fitness and frailty in elderly people

Kenneth Rockwood, Xiaowei Song, Chris MacKnight, Howard Bergman, David B. Hogan, Ian McDowell, Arnold Mitnitski

1. Very fit
   • Robust, active, energetic and motivated; exercises regularly

2. Well
   • No active disease symptoms; seasonally active

3. Managing
   • Medical problems are well controlled, but not active beyond routine walking
4. Vulnerable

- Not dependent for care, but symptoms limit activity; commonly feel “slowed up” or tired during the day

Rockwood et al CMAJ 2005
5. Mildly frail

- More evidence of slowing, and need help with higher level IADLs; impairs shopping, walking outside alone, meal preparation

6. Moderately frail

- Require assistance with all outdoor activities and housekeeping; difficulty with stairs and bathing

7. Severely frail

- Completely dependent for care or terminally ill
8. Very severely frail

- Completely dependent for care, and would be unlikely to recover from even a minor illness

9. Terminally ill

- Approaching the end of life, applies to people with a life expectancy < 6 months, who are not otherwise frail
Survival and Frailty

A global clinical measure of fitness and frailty in elderly people

Kenneth Rockwood, Xiaowei Song, Chris MacKnight, Howard Bergman, David B. Hogan, Ian McDowell, Arnold Mitnitski

Survival

Institutionalization

Rockwood et al CMAJ 2005
Frailty is associated with postoperative complications in older adults with medical problems.

Monidipa Dasgupta\textsuperscript{a,*}, Darryl B. Rolfson\textsuperscript{b}, Paul Stolee\textsuperscript{c,d}, Michael J. Borrie\textsuperscript{e}, Mark Speechley\textsuperscript{d,f}

\(n=125\)

**Post-operative Complications**

<table>
<thead>
<tr>
<th>EFS score</th>
<th>Proportion</th>
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<tbody>
<tr>
<td>&lt;4</td>
<td>9.8</td>
</tr>
<tr>
<td>≥4</td>
<td>35.5</td>
</tr>
<tr>
<td>≤7</td>
<td>20.0</td>
</tr>
<tr>
<td>&gt;7</td>
<td>56.0</td>
</tr>
</tbody>
</table>

Age-adjusted OR complications \textbf{5.02} (95% CI, 1.5-16.3)

\(n=125\); aged > 70; pre-op clinic; elective; non-cardiac surgery

Dasgupta et al Arch Ger Ger 2009
**Frailty as a Predictor of Surgical Outcomes in Older Patients**

Martin A Makary, MD, MPH, FACS, Dorry L Segev, MD, PhD, FACS, Peter J Pronovost, MD, PhD, Dora Syin, MD, Karen Bandeen-Roche, PhD, Purvi Patel, MD, MPH, Ryan Takenaga, MD, Lara Devgan, MD, MPH, Christine G Holzmueller, BLA, Jing Tian, MS, Linda P Fried, MD, MPH

<table>
<thead>
<tr>
<th></th>
<th>Non-Frail (58.2%)</th>
<th>Intermediate (31.3%)</th>
<th>Frail (10.4%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n=594</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age (yrs)</strong></td>
<td>71 (67-94)</td>
<td>75 (65-92)</td>
<td>76 (65-94)</td>
</tr>
<tr>
<td><strong>Female Sex (%)</strong></td>
<td>67.6</td>
<td>52.7</td>
<td>41.9</td>
</tr>
<tr>
<td><strong>30-d complications</strong></td>
<td>1.0</td>
<td>2.06 (1.2-3.6)</td>
<td><strong>2.54 (1.1-5.8)</strong></td>
</tr>
<tr>
<td><strong>Length of stay (d)</strong></td>
<td>1.0</td>
<td>1.49 (1.2-1.8)</td>
<td><strong>1.69 (1.3-2.2)</strong></td>
</tr>
<tr>
<td><strong>Institutionalized (%)</strong></td>
<td>1.0</td>
<td>3.2 (1.0-9.9)</td>
<td><strong>20.5 (5.5-76)</strong></td>
</tr>
</tbody>
</table>

**FRAILTY** defined by the phenotype criteria proposed by Fried

Makary et al JACS 2010
One-year follow-up of patients undergoing elective cardiac surgery assessed with the Comprehensive Assessment of Frailty test and its simplified form

Simon Sündermann\textsuperscript{a,}, Anika Dademasch\textsuperscript{b}, Ardawan Rastan\textsuperscript{b}, Julian Praetorius\textsuperscript{b}, Héctor Rodriguez\textsuperscript{a}, Thomas Walther\textsuperscript{c}, Friedrich-Wilhelm Mohr\textsuperscript{b}, Volkmar Falk\textsuperscript{a}

OR 1.11, 95% CI, 1.05-1.17, \textit{p}<0.001

AuROC: 0.67; 0.70

CAF (simplified): chair rise; stair climb; CFS; serum creatinine
One-year follow-up of patients undergoing elective cardiac surgery assessed with the Comprehensive Assessment of Frailty test and its simplified form

Simon Sundermann\textsuperscript{a}, Anika Dademasch\textsuperscript{b}, Ardawan Rastan\textsuperscript{b}, Julian Praetorius\textsuperscript{b}, Héctor Rodriguez\textsuperscript{a}, Thomas Walther\textsuperscript{c}, Friedrich-Wilhelm Mohr\textsuperscript{b}, Volkmar Falk\textsuperscript{a}

Mortality (%)  

<table>
<thead>
<tr>
<th>Frailty Level</th>
<th>In-Hospital</th>
<th>1-Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Frail</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Moderately Frail</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Severely Frail</td>
<td>15</td>
<td>42</td>
</tr>
</tbody>
</table>

Sundermann et al ICVTS 2011
**Cardiovascular Surgery**

### Frail Patients Are at Increased Risk for Mortality and Prolonged Institutional Care After Cardiac Surgery

Dana H. Lee, BSc; Karen J. Buth, MSc; Billie-Jean Martin, MD; Alexandra M. Yip, MSc, OT(C); Gregory M. Hirsch, MD, FRCSC

<table>
<thead>
<tr>
<th></th>
<th>Non-Frail (n=3669)</th>
<th>Frail (n=157, 4.3%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood transfusion (%)</td>
<td>33.8</td>
<td>61.8</td>
<td>0.0001</td>
</tr>
<tr>
<td>LCOS (%)</td>
<td>10.2</td>
<td>21.7</td>
<td>0.0001</td>
</tr>
<tr>
<td>Sepsis (%)</td>
<td>3.3</td>
<td>11.5</td>
<td>0.0001</td>
</tr>
<tr>
<td>Pneumonia (%)</td>
<td>7.3</td>
<td>20.4</td>
<td>0.0001</td>
</tr>
<tr>
<td>Delirium (%)</td>
<td>9.1</td>
<td>14.7</td>
<td>0.0001</td>
</tr>
<tr>
<td>Prolonged MV (%)</td>
<td>15.9</td>
<td>36.6</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

FRAILTY defined as composite of: Katz index (ADL); ambulation; dementia
## Cardiovascular Surgery

Frail Patients Are at Increased Risk for Mortality and Prolonged Institutional Care After Cardiac Surgery

Dana H. Lee, BSc; Karen J. Buth, MSc; Billie-Jean Martin, MD; Alexandra M. Yip, MSc, OT(C); Gregory M. Hirsch, MD, FRCSC

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-Hospital Mortality</td>
<td>1.8</td>
<td>1.1-3.0</td>
<td>0.03</td>
</tr>
<tr>
<td>Institutionalization</td>
<td>6.3</td>
<td>4.2-9.4</td>
<td>0.0001</td>
</tr>
<tr>
<td>Long-term Mortality</td>
<td>1.5</td>
<td>1.1-2.2</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Frailty in the critically ill: a novel concept

Robert C McDermid¹, Henry T Stelfox² and Sean M Bagshaw¹*

• **Design:**
  – Prospective observational cohort study

• **Setting:**
  – 6 hospitals (2 academic + 4 community-based)

• **Population:**
  – All patients age ≥ 50 years admitted to ICU

• **Exposure:**
  – Frailty assessed by CFS
Prevalence of “Frailty” ~ 32.8% (95% CI, 26.8-36.1)

n=421
**ICU FRAILTY - Agreement**

Agreement between CO-ORDINATOR and PHYSICIAN for CFS score at baseline

<table>
<thead>
<tr>
<th>CFS Score</th>
<th>Coordinator</th>
<th>Physician</th>
<th>Mean Diff (95% CI)</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Mean (SD)</td>
<td>N</td>
<td>Mean (SD)</td>
<td></td>
</tr>
<tr>
<td>369</td>
<td>4.09 (1.61)</td>
<td>369</td>
<td>4.03 (1.77)</td>
<td>0.06 (-0.08, 0.20)</td>
</tr>
</tbody>
</table>
## ICU FRAILTY - Baseline

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>Non-FRAIL</th>
<th>FRAIL</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>66.2 (9.7)</td>
<td>69.0 (10.1)</td>
<td>0.007</td>
</tr>
<tr>
<td>Female sex (%)</td>
<td>34.3</td>
<td>47.8</td>
<td>0.007</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>20.8 (7.3)</td>
<td>31.1 (11.8)</td>
<td>0.008</td>
</tr>
<tr>
<td>Widowed (%)</td>
<td>9.9</td>
<td>18.2</td>
<td>0.03</td>
</tr>
<tr>
<td>Grades 1-9 only (%)</td>
<td>19.4</td>
<td>28.9</td>
<td>0.06</td>
</tr>
<tr>
<td>Independent at home (%)</td>
<td>86.2</td>
<td>42.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Elixhauser Comorbidity</td>
<td>6.7 (7.3)</td>
<td>9.8 (8.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Post-Surgical (%)</td>
<td>38.2</td>
<td>24.6</td>
<td>0.006</td>
</tr>
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</table>
## ICU FRAILTY - Course

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>Non-FRAIL</th>
<th>FRAIL</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOFA (4 day average)</td>
<td>6.2 (3.7)</td>
<td>6.8 (3.5)</td>
<td>0.15</td>
</tr>
<tr>
<td>Mechanical ventilation (%)</td>
<td>84.8</td>
<td>88.4</td>
<td>0.32</td>
</tr>
<tr>
<td>Vasoactive therapy (%)</td>
<td>51.6</td>
<td>60.1</td>
<td>0.10</td>
</tr>
<tr>
<td>Blood transfusion (%)</td>
<td>39.9</td>
<td>41.3</td>
<td>0.79</td>
</tr>
<tr>
<td>Renal Replacement (%)</td>
<td>11.7</td>
<td>10.1</td>
<td>0.64</td>
</tr>
<tr>
<td>Adverse events (%)</td>
<td>29.3</td>
<td>39.1</td>
<td>0.04</td>
</tr>
</tbody>
</table>
ICU FRAILTY - Mortality

<table>
<thead>
<tr>
<th></th>
<th>ICU</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Frail</td>
<td>9.5</td>
<td>17.0</td>
</tr>
<tr>
<td>Frail</td>
<td>11.6</td>
<td>34.1</td>
</tr>
</tbody>
</table>

* * p<0.001
ICU FRAILTY - Mortality

Kaplan-Meier Survival Estimates by Frailty

Log-rank, p< 0.0001

Number at risk
- No Frailty: 276
- Frailty: 135

Follow up time in days from ICU admission
- No Frailty: 217
- Frailty: 79
ICU FRAILTY - Mortality

Kaplan-Meier Survival Estimates by CFS Score

Number at risk
CFS score: 1-3 143
  4 133
  5 51
  6-9 84

Follow up time in days from ICU admission
0 200 400

Log-rank, p< 0.0001
ICU FRAILTY - Disposition

- Home - Independent: Pre-Hospital 42.0%, Post-Hospital 22.0%
- Home - Assistance: Pre-Hospital 46.4%, Post-Hospital 36.3%
- Assisted Care Facility: Pre-Hospital 17.6%, Post-Hospital 6.5%
EXERCISE TRAINING AND NUTRITIONAL SUPPLEMENTATION FOR PHYSICAL FRAILTY IN VERY ELDERLY PEOPLE

Early intensive care unit mobility therapy in the treatment of acute respiratory failure

Peter E. Morris, MD; Amanda Goad, RN; Clifton Thompson, RN; Karen Taylor, MPT; Bethany Harry, MPT; Leah Passmore, MS; Amelia Ross, RN, MSN; Laura Anderson; Shirley Baker; Mary Sanchez; Lauretta Penley; April Howard, RN; Luz Dixon, RN; Susan Leach, RN; Ronald Small, MBA; R. Duncan Hite, MD; Edward Haponik, MD
Early intensive care unit mobility therapy in the treatment of acute respiratory failure*

Peter E. Morris, MD; Amanda Goad, RN; Clifton Thompson, RN; Karen Taylor, MPT; Bethany Harry, MPT; Leah Passmore, MS; Amelia Ross, RN, MSN; Laura Anderson; Shirley Baker; Mary Sanchez; Lauretta Penley; April Howard, RN; Luz Dixon, RN; Susan Leach, RN; Ronald Small, MBA; R. Duncan Hite, MD; Edward Haponik, MD

<table>
<thead>
<tr>
<th></th>
<th>Out of Bed</th>
<th>Hospital Stay</th>
<th>ICU Stay</th>
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<tbody>
<tr>
<td><strong>EM Protocol</strong></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Usual Care</strong></td>
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</table>

p<0.05
Receiving Early Mobility During an Intensive Care Unit Admission Is a Predictor of Improved Outcomes in Acute Respiratory Failure

Peter E. Morris, MD, Leah Griffin, MS, Michael Berry, PhD, Clif Thompson, RN, R. Duncan Hite, MD, Chris Winkelman, PhD, Ramona O. Hopkins, PhD, Amelia Ross, MSN, Luz Dixon, RN, Susan Leach, RN and Edward Haponik, MD

<table>
<thead>
<tr>
<th>Predictor</th>
<th>OR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Sex</td>
<td>1.94 (1.13-3.32)</td>
<td>0.02</td>
</tr>
<tr>
<td>Tracheostomy</td>
<td>4.02 (1.72-9.40)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Charlson Index</td>
<td>1.15 (1.01-1.31)</td>
<td>0.03</td>
</tr>
<tr>
<td>EM Protocol</td>
<td>1.77 (1.04-3.01)</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Previous Study Enrollment n = 330
Hospital Survivors n = 280

Population in current analysis
Readmissions or deceased at 12 months n = 132
Alive and without Readmission n = 126
Lost to Follow-up n = 22
Conclusions – FRAILTY...

- a multi-dimensional syndrome contributing to ↓ physiologic reserve + ↑ vulnerability to adverse events
- prospectively captured with validated tools
- common in critical illness
- associated with ↑ risk for mortality and care transition
- assessment may ultimately improve prognostication, guide clinical care, and resource utilization
Thank You For Your Attention

Acknowledgements:

Investigators: Tom Stelfox, Rob McDermid, Sumit Majumdar, Daryl Rolfson, Daniel Stollery, Ella Rokosh

Coordinators: Tracy Davyduke, Maliha Muneer, Nadia Baig, Barbara Artiuch, Kristen Reid, Gwen Thompson, Robin Scheelar, Jennifer Barchard, Samantha Taylor

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