FRAILTY AND PROGNOSTICATION

URMC Geriatric Grand Rounds 06/23/21

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Learning Objectives

Define and assess Frailty

What is prognostication

Know that Frailty affects prognosis and prognostication

Frailty is not old age
What is Frailty

Aging-related syndrome of physiological decline

Common Features of Frailty

People who are frail usually have three or more of five symptoms that often travel together. These include

unintentional weight loss (10 or more pounds within the past year),

muscle loss and weakness

fatigue

slow walking speed

dlow levels of physical activity.
Manifestation of Frailty

Manifests as decreased physiological reserve to overcome stressors such as infection/trauma/surgery or even to handle extreme heat or cold.

Frailty increases poor health outcomes including falls, incident disability, hospitalization and mortality.

Clinical manifestations become apparent when dysregulation reaches a critical threshold.

Most severely frail OA appear to be in an irreversible, predeath phase with high mortality in 6-12 months.
Frailty Spectrum

Frailty spectrum

Positive indicators for resources
- Robustness
- Fitness

Negative indicators for risk factors
- Decline in Resources
- Increase of risks / vulnerability
- Fatigability
  - i.e. E-ADL
- External support
  - i.e. I-ADL
- Need of nursing care
  - i.e. B-ADL

Clinical complications
- Disability
- Impairment
- Handicap
- Terminal phase

Functional Ability (FA) Index developed in LUCAS

Based on the theoretical models of
Bergman H et al., Gérontologie et société 2004; 109:15-29

1: E-ADL: External activities of daily living
2: I-ADL: Instrumental activities of daily living
3: B-ADL: Basic activities of daily living
Prognostication- Definition

Prognostication is a broader term that incorporates both estimating and communicating prognosis.

In Geriatric medicine:

- estimating prognosis using patient-relevant outcomes
- communicating prognosis
- incorporating lag time to benefit

How potential diagnostic or therapeutic interventions can help patients and clinicians in the process of shared decision making with patient-centered care in mind.
Why Frailty matter

Prevention or delay of functional status decline, progression to disability, with its characteristic loss of personal self-sufficiency has been one of the main classical but also ongoing objectives of geriatric medicine.

“If we assess frail, older people well and treat underlying causes of deterioration, there is great potential to make them less dependent, less immobile, less fearful and less confused – and in turn, less reliant on care.” – Innovation Partnership on Active and Healthy Aging

Interventions can prevent/delay transition to advanced spectrum
Continuation

A pt at moderate risk for long-term worse outcomes may decide against a procedure if they know the incremental risk from associated frailty and related health challenges.

A pt at high risk may be a better candidate if they are not frail and have good functional status.

Assessment of frailty may reclassify individuals to new and clinically meaningful risk categories.

Identifying frailty can also prompt more comprehensive geriatric evaluation and interventions that improve functional status.
Frailty in Older Adults: Evidence for a Phenotype

To develop and operationalize a phenotype of frailty in older adults and assess concurrent and predictive validity, the study used data from the Cardiovascular Health Study. Participants were 5,317 men and women 65 years and older (4,735 from an original cohort recruited in 1989–90 and 582 from an African American cohort recruited in 1992–93).

By Linda Fried
Instruments developed to identify Frailty

Fried Frailty Tool

<table>
<thead>
<tr>
<th>Item</th>
<th>Type of measure</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking speed</td>
<td>Timed 15 foot (5 metre) walk</td>
<td>Slowest 20% by gender and height</td>
</tr>
<tr>
<td>Grip strength</td>
<td>Dynanometer</td>
<td>Weakest 20% by gender and body mass index.</td>
</tr>
<tr>
<td>Weight loss</td>
<td>Self-report</td>
<td>Lost 10 lbs (4.5 kg) in the past year</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Self-report: ‘trouble getting going’</td>
<td></td>
</tr>
<tr>
<td>Activity level</td>
<td>Self-report: number of calories expended</td>
<td>Lowest 20%. Males: 383 kcals/week Females: 270 kcals/ week</td>
</tr>
</tbody>
</table>
Cycle of Frailty
Organ, system and Functional levels

INRINSIC CAPACITY SPECTRUM

Organ level
Systemic level
Functional level

Isolated physiologic vulnerability
IMPAIRMENT OF MULTIPLE SYSTEMS
Multiple non-reversible conditions

Frailty spectrum

FUNCTIONAL CONTINUUM

Robustness
High level of intrinsic capacity
High functional reserve

Low functional reserve

Disability/Dependency
Absence of functional reserve

Severe Dependency
Death

Oxidative stress
Inflammation
Compromised response to stress

Medicine of the Highest Order

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Prevalence of Frailty

Varies with the tools used

7-10% of the community-dwelling OA

Has 3 or more of the 5 diagnostic criteria

[wt loss, exhaustion, weakness, slow walking speed and decreased physical activity]

28-28% Pre-Frailty : one or 2 of the criteria

43% in older pts with Cancer
Gait Speed and Survival in Older Adults
Stephanie Studenski MD

<table>
<thead>
<tr>
<th>Gait Speed, m/s</th>
<th>Age</th>
<th>Men</th>
<th>Age</th>
<th>Women</th>
<th>Age</th>
<th>Men</th>
<th>Age</th>
<th>Women</th>
<th>Age</th>
<th>Men</th>
<th>Age</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed &lt; 0.4</td>
<td>65-74</td>
<td>68 (47-82)</td>
<td>60 (38-76)</td>
<td>25 (15-36)</td>
<td>80 (71-86)</td>
<td>69 (58-78)</td>
<td>47 (40-54)</td>
<td>56 (23-80)</td>
<td>15 (4-33)</td>
<td>8 (3-18)</td>
<td>58 (46-69)</td>
<td>35 (24-47)</td>
</tr>
<tr>
<td>≧0.4 to &lt; 0.6</td>
<td>77 (72-81)</td>
<td>57 (49-64)</td>
<td>31 (24-39)</td>
<td>88 (85-90)</td>
<td>75 (68-80)</td>
<td>61 (50-70)</td>
<td>53 (41-64)</td>
<td>23 (15-31)</td>
<td>6 (3-11)</td>
<td>67 (61-72)</td>
<td>42 (36-48)</td>
<td>18 (9-30)</td>
</tr>
<tr>
<td>≧0.8 to &lt; 0.8</td>
<td>79 (74-83)</td>
<td>65 (67-71)</td>
<td>49 (35-61)</td>
<td>91 (89-93)</td>
<td>82 (78-86)</td>
<td>74 (69-78)</td>
<td>57 (52-62)</td>
<td>31 (24-38)</td>
<td>11 (3-28)</td>
<td>74 (71-77)</td>
<td>52 (48-57)</td>
<td>23 (18-28)</td>
</tr>
<tr>
<td>≧0.8 to &lt; 1.0</td>
<td>85 (82-88)</td>
<td>75 (69-79)</td>
<td>54 (43-64)</td>
<td>93 (91-95)</td>
<td>89 (86-91)</td>
<td>73 (59-83)</td>
<td>67 (62-71)</td>
<td>43 (36-50)</td>
<td>14 (7-25)</td>
<td>80 (75-83)</td>
<td>62 (56-68)</td>
<td>39 (22-56)</td>
</tr>
<tr>
<td>≧1.0 to &lt; 1.2</td>
<td>90 (85-93)</td>
<td>83 (76-87)</td>
<td>68 (57-77)</td>
<td>96 (94-98)</td>
<td>91 (87-94)</td>
<td>61 (35-79)</td>
<td>69 (63-74)</td>
<td>53 (46-59)</td>
<td>50 (6-84)</td>
<td>86 (82-89)</td>
<td>73 (70-77)</td>
<td>33 (21-54)</td>
</tr>
<tr>
<td>≧1.2 to &lt; 1.4</td>
<td>93 (86-96)</td>
<td>85 (79-89)</td>
<td>62 (46-74)</td>
<td>96 (94-97)</td>
<td>93 (87-96)</td>
<td>67 (5-95)</td>
<td>75 (40-91)</td>
<td>51 (16-78)</td>
<td>NE</td>
<td>83 (38-96)</td>
<td>80 (72-86)</td>
<td>NE</td>
</tr>
<tr>
<td>Speed ≥ 1.4</td>
<td>95 (89-97)</td>
<td>93 (86-96)</td>
<td>91 (51-99)</td>
<td>97 (94-99)</td>
<td>95 (72-99)</td>
<td>NE</td>
<td>93 (81-98)</td>
<td>50 (6-84)</td>
<td>NE</td>
<td>87 (71-95)</td>
<td>92 (71-98)</td>
<td>NE</td>
</tr>
<tr>
<td>All gait speeds</td>
<td>87 (82-91)</td>
<td>74 (65-81)</td>
<td>46 (39-53)</td>
<td>93 (91-94)</td>
<td>84 (80-87)</td>
<td>64 (58-70)</td>
<td>62 (58-66)</td>
<td>36 (30-42)</td>
<td>10 (8-13)</td>
<td>77 (71-82)</td>
<td>54 (46-60)</td>
<td>22 (15-29)</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; NE, not estimable due to small number of participants in categories.

*Survival estimates are derived from individual study Kaplan-Meier survival estimates that are pooled across studies using random-effects models with inverse variance weighting.*
Gait Speed and Survival in Older Adults
Stephanie Studenski MD

Figure 2. Predicted Median Life Expectancy by Age and Gait Speed

- Men
- Women

- Median Survival, y
- Age, y
- Gait speed, m/s

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MEDICINE of THE HIGHEST ORDER
The Clinical Frailty Scale (CFS) was introduced in the second clinical examination of the Canadian Study of Health and Aging (CSHA) as a way to summarize the overall level of fitness or frailty of an older adult after they had been evaluated by an experienced clinician (Rockwood et al., 2005).
## Morbidity/Mortality outcomes of frailty

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Participants (n)</th>
<th>Length of follow-up (years)</th>
<th>Falls (HR*/OR† [95% CI])</th>
<th>Worsening disability (HR*/OR† [95% CI])</th>
<th>Hospitalisation (HR*/OR† [95% CI])</th>
<th>Care home admission (HR*/OR† [95% CI])</th>
<th>Mortality (HR*/OR† [95% CI])</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intermediate frailty</td>
<td>Severe frailty</td>
<td>Intermediate frailty</td>
<td>Severe frailty</td>
<td>Intermediate frailty</td>
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<tr>
<td>2001</td>
<td>USA</td>
<td>5317</td>
<td>7</td>
<td>1.12* (1.00-1.26)</td>
<td>1.23* (0.99-1.54)</td>
<td>1.55* (1.38-1.75)</td>
<td>1.79* (1.47-2.17)</td>
<td>NA</td>
</tr>
<tr>
<td>2004</td>
<td>Canada</td>
<td>9008</td>
<td>5</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>2.54† (1.67-3.86)</td>
</tr>
<tr>
<td>2006</td>
<td>USA</td>
<td>1438</td>
<td>3</td>
<td>0.92* (0.63-1.64)</td>
<td>1.18* (0.63-2.19)</td>
<td>NA</td>
<td>NA</td>
<td>5.16† (0.81-3.79)</td>
</tr>
<tr>
<td>2008</td>
<td>USA</td>
<td>6701</td>
<td>4.5</td>
<td>1.23† (1.02-1.48)</td>
<td>2.44† (1.95-3.04)</td>
<td>1.89† (1.66-2.14)</td>
<td>2.79† (2.31-3.37)</td>
<td>NA</td>
</tr>
</tbody>
</table>

*HR=hazard ratio. NA=not available. OR=odds ratio. †Hazard ratio. ‡Odds ratio. The comparator for hazard ratios and odds ratios is people who are not frail.

Table: Covariate-adjusted associations between frailty and adverse outcomes (falls, disability, hospitalisation, care home admission, and mortality) from four large prospective cohort studies

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*Image from a Table of results from a study on frailty outcomes.*
Conceptual framework of Frailty

Physical Frailty also termed phenotypic or syndrome frailty:

Captures signs and symptoms [previous slide]

Deficit accumulation frailty or index frailty:

Cumulative comorbidities

COPD/CHF/DM/CKD

illnesses

CVA or Cancer
Phenotypic and Index Frailty

Physical frailty

[Phenotypic]

Index Frailty

65 y/o with COPD/CHF/DM/CKD on HD, 3rd admission

72 y/o pt with HTN/HLD, 8 months ago with independent ADL/IADLs, having a CVA
Factors associated with frailty

Old age
Lower educational level
Current smoker
Depression or use of antidepressants
Intellectual disability
Not married
In a US sample, AA or Hispanic ethnicity
Current use of postmenopausal hormone therapy
NOT ALL OA ARE FRAIL
PATIENT EVALUATION

If Frailty is a potential concern [physician observation, c/o pt or family reporting] related to activity levels, diet, cognition, Wt, the following should be ascertain.

Energy level, excessive fatigue

Ability to perform or maintain physical activities like stair climbing

Ability to get out of the home/walk one block

Physical exam should include

ability to rise from a chair 5 x without use of arms
ability to walk across the room
FRAIL scale is a modified version and easy to perform in the clinic: Yes /No questioner

FRAIL Scale

- Fatigue
- Resistance (the ability to climb one flight of stairs)
- Ambulation (the ability to walk one block)
- Illness (greater than five)
- Loss of weight (>5%)

Scoring: 0 = Robust  1-2 = Pre-frail  > 3 = Frail

Illnesses
HTN, DM, Cancer [other than minor skin Ca]
Chronic lung disease, heart attack,
CHF,
Angina, Asthma, CVA, Kidney disease
Differential Diagnosis

When considering the diagnosis of Frailty, it is crucial to develop a DD list and R/O underlying medical and psychological issues that may be driving S/S that can be Rx ed.

Depression

Malignancy - Lymphoma, MM, Occult solid tumors

Rheumatologic disease – PMR, vasculitis

Endocrine disease – Thyroid, DM

Cardiovascular disease-  HTN, HF, CAD, PVD
Continuation

Hematologic disease – Anemia, Myelodysplasia
Renal disease – Renal insufficiency
Nutritional deficits - Vitamin deficiencies
Neurologic disease – PD, Vascular Dementia, Serial lacunar infarcts
Laboratory testing: when evaluating for the first time

CBC
CMP
Vit B12
Vit D
TSH

Consideration of further W/U for other conditions if Hx suggested
Transition between frailty spectrum

Interventions can prevent/delay transition to advanced spectrum
Pathologies responsible of frailty related to diseases
Longitudinal Relationship Between Knee Pain, Incident Frailty: Data from the Osteoarthritis Initiative

Knee pain particularly bilateral knee pain is associated with an increased risk of developing prefrailty and frailty over time than unilateral knee pain.
Interventions

Exercise - even modest activity can have a positive effect on muscle strengthening

OT- Moderate improvement with ADLs, social participation and mobility c/w baseline

Nutritional supplement-

assess difficulty with chewing/swallowing

avoid unnecessary dietary restrictions [low salt/low fat]

low volume high caloric drinks/puddings

Vit D  800- 1000IU
Continued

Medication Review – according to pts established goals of care

D/C of medications with SE that may be contributing to frailty[statins] or Rx prescribed for conditions that no longer exists

Substitute with a safer agent

Changing drug doses – establish new targets for chronic conditions such as DM/HTN

Add new medications for conditions that can have a positive impact: antidepressants, Rx to improve sleep

Cognitive training
Ineffective interventions

Testosterone

Growth hormone or growth hormone releasing factor supplementation

DHEA-S
Impact of Frailty in OA

Considered to be the hallmark of geriatric syndrome that is a forerunner to other conditions:

- Frequent falls
- Fractures
- Delirium
- Cognitive impairment
- Incontinence
AVOID Frailty

A activity

V vaccination

O optimize [meds]

I interact [loneliness /social isolation]

D diet [protein, Ca/ Vit D]
As Clinicians

The 3 pillars of clinical practice
- diagnosis - All the time
- treatment - All the time
- prognosis - How often?
Prognosis and Prognostication

Prognosis is defined as the likelihood of a pt developing a particular outcome over a specific period of time.

Prognostication is a vital aspect of decision making because it provides pts and families with information:

- To establish realistic and achievable GOC
- Determining eligibility for certain benefits [ Hospice]
- Target interventions to those likely benefit
The essential role of prognosis

The path forward would seem obvious if only I knew how many months or years I had left. Tell me three months, I’d just spend time with my family. Tell me one year, I’d have a plan [write that book]. Give me ten years, I’d get back to treating diseases

Paul Kalanithi MD
Formulation of the prognosis
(Clinician estimates the likelihood of a particular outcome over a specific time period)

Communication of the prognosis
(Clinician discloses the formulated prognosis to the patient and/or family)

Interpretation of the prognosis
(Patient and/or surrogate interprets the communicated prognosis)
Components of Prognostication

Estimating prognosis by the clinician – available methods are

- Clinical Judgment
- Age based life expectancy
- Published studies
- Published prognostic indices

Communicating in accordance with the pts information preferences

Prognostic estimate is interpreted by the pt/surrogate and used in clinical decision making
<table>
<thead>
<tr>
<th>Age</th>
<th>Women</th>
<th></th>
<th></th>
<th>Men</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Top 75th Percentile</td>
<td>50th Percentile</td>
<td>Lowest 25th Percentile</td>
<td>Top 75th Percentile</td>
<td>50th Percentile</td>
<td>Lowest 25th Percentile</td>
</tr>
<tr>
<td>65</td>
<td>26.9</td>
<td>21.2</td>
<td>14.2</td>
<td>24.3</td>
<td>18.3</td>
<td>11.4</td>
</tr>
<tr>
<td>70</td>
<td>22.2</td>
<td>16.9</td>
<td>10.7</td>
<td>19.8</td>
<td>14.4</td>
<td>8.5</td>
</tr>
<tr>
<td>75</td>
<td>17.8</td>
<td>12.9</td>
<td>7.6</td>
<td>15.6</td>
<td>10.8</td>
<td>6</td>
</tr>
<tr>
<td>80</td>
<td>13.6</td>
<td>9.3</td>
<td>5.1</td>
<td>11.8</td>
<td>7.7</td>
<td>4</td>
</tr>
<tr>
<td>85</td>
<td>9.9</td>
<td>6.3</td>
<td>3.2</td>
<td>8.5</td>
<td>5.2</td>
<td>2.5</td>
</tr>
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<td>90</td>
<td>6.9</td>
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<td>5.9</td>
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<td>95</td>
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<td>1.2</td>
<td>4.1</td>
<td>2.2</td>
<td>1</td>
</tr>
</tbody>
</table>
Common Prognostic Indices

Non disease-specific examples

Walter 1yr index  Hospitalized  >70 yrs
www.ePrognosis.org

Lee 4-and 10-yr index  community dwelling >50yrs
Schonberg 5-and 9-yr  community dwelling >65yrs

Go-FAR  Cardiac arrest while in hospital
www.gofarcalc.com
Continuation

Disease Specific

Cancer: Palliative performance scale [www.ePrognosis.org]

Dementia: ADEPT [NH residents with advanced dementia] [www.ePrognosis.org]

COPD: BODE
Communicating Prognosis

SPIKES framework for delivering serious news


- **S**etting (e.g., ensuring a private location, minimizing interruptions)
- **P**erception (e.g., assessing the patient’s understanding)
- **I**nvitation (e.g., clarifying what information the patient wants to know)
- **K**nowledge (e.g., stating the information clearly)
- **E**motion (e.g., identifying and responding to patient’s emotion with empathy)
- **S**ummarize/strategize (e.g., determining next steps, closing the encounter)
Barriers to prognostication

Fear of being judged for inaccurate predictions
Discomfort with disclosing serious news
Inadequate communications skills training
Fear of diminishing pts hope
Fear of causing pts distress or reducing their quality of life
Guilt associated with not being to offer curative Rx
As the aging population increases, the traditional paradigm of stand-alone disease medicine become irrelevant. OA have multiple chronic comorbidities and mutually interacting syndromes. Frailty is a geriatric syndrome that should be taken into account when assessing prognosis. Pts who have a good understanding of their prognosis tend to make life choices that are important to them.
Clinical implications

A pt at moderate risk for long-term worse outcomes may decide against a procedure if they know the incremental risk from associated frailty and related health challenges.[HD]

A pt at high risk may be a better candidate if they are not frail and have good functional status. [ 

Assessment of frailty may reclassify individuals to new and clinically meaningful risk categories. Identifying frailty can also prompt more comprehensive geriatric evaluation and interventions that improve functional status – and possibly reverse deteriorating conditions and restore an older patient to non-frail status.
Take home points

Frailty is an aging-related syndrome of physiological decline characterized by marked vulnerability to adverse health outcomes.

Frailty should be considered when estimating prognosis.

Prognostication is a vital aspect of decision making/establishing GOC for the pt/families.

Not all OA are frail, Rx /interventions should be patient centered and individualized.
Video
References


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Stephanie Studenski, MD, MPH et al JAMA. 2011;305(1):50-58

Saad M. Bindawas, PhD,* Vishal Vennu, MSc,* and Brendon Stubbs, PhD Pain Medicine 2018; 19: 2146–2153 doi: 10.1093/pm/pnx296

Andrew Clegg, John Young, Steve Iliffe, Marcel Olde Rikkert, Kenneth Rockwood Lancet 2013; 381: 752–62 Published Online February 8, 2013 http://dx.doi.org/10.1016/ S0140-6736(12)62167-9Stephanie Studenski, MD, MPH

Jeremy D Walston MD Literature review up to date