Frailty: A contemporary healthcare priority

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Frailty: Disability: Multimorbidity:

The ambiguity of patient-centered care

Triumvirate of geriatric domains

New demographic challenges:
Burgeoning population of older adults

Clinical Frailty

Clinical Frailty

Cumulative declines across multiple physiologic systems

↓ Reserve and resistance to stressors

↑ Vulnerability to adverse outcomes
Clinical Frailty

Limitations of the eyeball test

Ed Whitlock, Age 81

Toronto Marathon
3 hr 15 min

The Frailty Phenotype

- Slowness
- Weakness 0 Robust
- Physical Activity 1-2 Prefrail
- Fatigue 3-5 Frail
- Weight

- 7% Frail, 47% Prefrail
- Women 2x men


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- Cognition, Mood, Obesity


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- Men 2x women
- Inflammation, Hypertension, Hypertension

Overlap with cardiac pathophysiology

- Overlapping biology of frailty and CVD
- ↑ developing CVD in those who are frail
- ↑ mortality CVD risk 2-fold in those who are frail
  - Increased risk of delirium, falls, post-hospital syndrome, institutionalization
  - Re-hospitalizations

A cycle of frailty

- Aging
- Poor nutrition
- ↓ strength
- ↓ Insulin sensitivity
- ↓ metabolic rate and activity
- Increased risk of delirium, falls, post-hospital syndrome, institutionalization
- Increased risk of mortality CVD risk 2-fold in those who are frail

Frailty ≠ Disability

Frailty Index

- Deficit accumulation
  - Clinically designated symptoms, signs, diseases and disabilities.
- Canadian Study of Health and Aging
- Predictive of death, institutionalization, and poor outcomes within long-term care.

Frailty Phenotype

- Signs, symptoms
- Can perform the assessment at first contact
- Pre-defined set of criteria
- Categorical variable
- Can be frail in the absence of disease
- Can be limited by baseline physical or cognitive deficits

Frailty Index

- Frailty as an accumulation of deficits; diseases, ↓ activities of daily living, and also from a clinical evaluation
- Doable as part of a comprehensive clinical assessment
- Unspecified set of criteria
- meaningful results in every individual, independently of functional status or age

K Rockwood. JAGS. 2006;54:975-9

M Cesari. Age and Aging. 2014;43:1-12


A lack of consensus

- Frailty Phenotype
- Frailty Index
- Questionnaires
- Comprehensive Geriatric Assessment

Prognostic utility of gait speed

Gait speed has also been demonstrated to predict:

- Multimorbidity, atherosclerosis, cognition, inflammation
- Disability, hospitalization, institutionalization, disability
  = Marker of reserve

Disability

**Activities of Daily Living (ADLs)**
- Mobility, transferring
- Bathing and showering
- Dressing
- Self-feeding
- Personal hygiene and grooming
- Toilet hygiene

**Instrumental Activities of Daily Living (IADLs)**
- Housework
- Preparing meals
- Taking medications
- Managing money
- Shopping (groceries/clothing)
- Use of telephone (communication)
- Transportation

van Iersel MB. J Am Geriatr Soc. 2006;54:728-9
Multimorbidity

- 68% with ≥2 morbidities; 14% with ≥6 morbidities
- Complexity: disease interaction, medication interactions
- Compounded by frailty, disability...falls, delirium...

Multimorbidity in relation to common CV conditions in Medicare Beneficiaries (≥65 yrs)

- 50% of Medicare Beneficiaries ≥65 yrs have ≥2 CV morbidities
- Common morbidities include: some are independent, some are correlated

Risk Assessment: Integrating Frailty

- N=131
- Age ≥70
- CABG and Valve Surgery
- Gait speed ≤60 cm/s
- STS <15

- 43.2% 18.8% 21.7%

- 5.9% 110.5% 5.5%
TAVR (Transcatheter aortic valve replacement): Frailty assessment more challenging

Frailty

Futility?

Palliative Care

Modify Procedures

PubMed: CVD and frailty

Prohibitive Risk Patients in the PARTNER Trial - 1 Year Outcomes

Frailty

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 Modify Frailty

Futility?

Revitalize to modify frailty:
A contemporary healthcare priority

• Shared Decision Making
• Process of Care

Frailty
Palliative Care
 Modify Procedures
 Modify Frailty

1° and 2° Frailty Prevention

Frailty Intervention Trials

• PREHAB Study: Pre-operative rehabilitation for reduction of hospitalization after coronary bypass and valvular surgery…………………R Arora
• Rehab-HF……………………………D Kitzman
• Cardiac Rehabilitation???
Cardiac Rehabilitation: Enhancement of care (for all ages)

- Biological rationale:
  - Moderates aging physiology
    - Inflammation, oxidative stress
    - Body composition
  - Improves CV Physiology
- Augments Recovery:
  - Mood, cognition, endurance
- Reinforces Transitions:
  - ↑Adherence
  - ↓Re-hospitalization, ↑Independence

Expanding the “revitalize” model

- Broader eligibility to cardiac rehabilitation
  - ↑Diseases, Subclinical Diseases, Risk Factors
  - Flare as a risk factor
- Improved process: Telehealth?
- Exercise = complicated therapy
  - Aerobic: High intensity interval training?
  - Strength: Endurance, Power?
  - Balance Training
- Nutrition, Sleep:
  - Also complicated

Early Frailty

Futility?

Palliative Care  Modify Procedures  Modify Frailty

Life study: PA to mitigate risk of frailty

- Nutrition
- Vitamin D
- Modification of Medications
- Sleep

Other considerations??

Frailty  Futility  Palliative Care  Modify Procedures  Modify Frailty
Geroscience: Modify Aging!!

- Futility
- Modify Procedures
- Modify Frailty

Geroscience

• Goals to identify mechanisms underlying age and disease and potentially modify them

Birth
Morbidity
Onset
Death
DISEASE
Onset
Death
Birth
EXTEND
HEALTHSPAN

Brian Kennedy

Geroscience: Age and Chronic Disease

- Metabolism
- Macromolecular damage
- Epigenetics
- Inflammation
- Stem cells and regeneration
- Proteostasis
- Adaptation to stress

Gene Expression: mTOR, Sirtuins, IGF-1
Mitochondrial biogenesis
Telomeres

Jim Kirkland
Carlos Lopez-Otin


Summary: Frailty is important aspect of contemporary health management

- Common
- Impactful
  - Decision making and health management
- Potentially modifiable