Frailty and Aging – Managing from a Community Perspective

6th Annual Falls Prevention Conference
“End Falls This Fall”

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Shakespeare’s Seven Age of Man

All the world's a stage, And all the men and women merely players: They have their exits and their entrances; And one man in his time plays many parts, His acts being seven ages: ..... 

Last scene of all, That ends this strange eventful history, Is second childishness and mere oblivion, sans teeth, sans eyes, sans taste, sans everything.
Is frailty and functional decline an inevitable part of aging?

Jeanne Calment lived to 122
She smoke, drank and rarely exercised!
What do you understand by the term “Frail Elderly”? 

Which of the two individuals would you consider Frail and Why?
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What do you understand by the term “Frail Elderly”? 

- Gait*
- Dependency
- Low Mood
- Polypharmacy

- Fatigue / Inactivity*
- Isolation
- Weight Loss*
- Weakness*
Measuring Frailty

- **Phenotype model**
  - Weight loss, fatigue, low energy expenditure, slow gait, weak grip (Fried et al 2001)
  - Additional components: cognitive impairment, mood, disability (Sourail et al 2010)

- **Cumulative Physiological Dysfunctions**
  - presence of abnormalities in 3 of haematological, inflammatory, hormonal, adiposity, neuromuscular, or micronutrient systems predictive of frailty phenotype (Fried et al 2009)

- **Cumulative Deficits (Frailty index)**
  - CSHA identified 92 variables (Rockwood and Mitnitski 2001)
  - 10 year outcome suggested 36 variables predictive (Song, Mitnitski and Rockwood 2010)
  - CGA 10 domains plus co-morbidities (Jones, Song and Rockwood 2004)
Prevalence of Frailty

- Review of 21 Community studies (Phenotype model) suggest prevalence of 9.9% (Collard et al 2012)
  - Higher in women (9.6 vs 5.2%)
  - Increases with age
    - 65-69: 4%, 70-74: 7%, 75-79: 9%, 80-84: 16%, 85+: 26%
- Comparison of Phenotype models vs Frailty Index within CSHA 16.5 vs 23% (Rockwood, Andrew, and Mitnitski 2007; Song, Mitnitski and Rockwood 2010)
- Social vulnerability increases risk
  - 32.5% 5 year mortality vs 10.8% (Andrew et al 2012)
- Comorbidity commonly present
  - 68-75% of frail individuals have 2 or more CD’s (Fried at al 2004, Theou et al 2012)
  - Increases risk of functional impairment and mortality
Clinical Frailty Scale

1. Very fit
2. Well
3. Well, with treated co-morbid disease
4. Apparently vulnerable (slowed up or disease symptoms)
5. Mildly frail (some dependency in IADLs)
6. Moderately frail (help with IADLs and ADLs)
7. Severely frail (dependent for ADLs)

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Clinical Frailty Scale within CSHA Cohort
(2305 individuals 70 years and over)

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Probability of Institutionalization avoidance based on CSHA Frailty Scale

Probability of Survival based on CSHA Frailty Scale
Frailty is a “dynamic state”

Figure 2. Conceptual model of how risk factors cause frailty.
Defining Frailty

“A physiologic syndrome characterized by decreased reserve and resistance to stressors, resulting from cumulative decline across multiple physiologic systems, and causing vulnerability to adverse outcomes”

(Fried et al. 2003)

Or in other words –
Vulnerability to adverse outcomes resulting form an interaction of physical, socio-economic and co-morbidity factors
Contributory factors to Frailty

- Vulnerability to adverse outcomes resulting from an interaction of:
  - Physical
    - Extreme age
    - Weight loss
    - Fatigue/Inactivity/Poor grip strength
    - Slow gait
  - Socio-economic
    - Isolation
    - Caregiver gaps
    - Poverty: gender and immigration status
  - Co-morbidity factors
    - Impaired cognition/mood
    - Polypharmacy especially sedative use
    - Multiple chronic diseases
Physical Predictors of Frailty

- Extreme age

Despite stereotypes most of the elderly age well!
- Most of our images are based on the frail sub-set who frequently use medical services.
- Generally normal aging is associated with a reduction in functional reserve capacity in tissues and organs.
- Proportion with abnormal aging increases with age.
Physical Predictors of Frailty

- Extreme age
- Weight loss:
  - 10% of seniors in community malnourished
  - 20-30% individual in acute care or LTC malnourished
  - 30% early AD present with weight loss
Physical Predictors of Frailty

- Extreme age
- Weight loss
- Fatigue/Inactivity/Poor grip strength
  - Fatigue may be linked to underlying issues such as cardiopulmonary disease, anemia, metabolic/endocrine abnormalities etc
  - Important appreciate sarcopenia not inevitable
  - Impact of secondary loss
    - 1 day of bed rest = 1% muscle loss
    - 14-21 day of bed rest = immobile elder!
Physical Predictors of Frailty

- Extreme age
- Weight loss
- Fatigue/Inactivity/Poor grip strength
- Slow gait (TUG Test)
Socio-Economic Predictors of Frailty

Isolation

- 93% live in private households.
- Of these 2/3 live with family.
- Only 14% men live alone compared to 34% of women.
Marital Status and Life Expectancy

- Married men live 8 years longer than single men and 10 years longer than widowed.
- Married women live 3 years longer than single women and 4 years longer than widowed women.
Socio-Economic Predictors of Frailty

- Isolation
- Caregiver gaps
Aging and Care-giving

- Estimated that 80% of care by informal caregivers
- However:
  - 18% of those over 65 have no living offspring.
  - Nearly 20% have family living more than 90 minutes away by car.
  - Extremely old have old relatives.
  - Seniors are often caregivers themselves!
Socio-Economic Predictors of Frailty

- Isolation
- Caregiver gaps
- Poverty
The Elderly and Finance 2001

Elderly Canadians Living in Poverty* [1980 - 1999]

- **Single Women**
- **Single Men**
- **Senior Families**

* Based on after-tax Low Income Cut-off Lines

Incidence of Low Income

Year
Co-Morbidity Predictors of Frailty

- Impaired cognition/mood
  - Worsens outcomes
  - Increased LOS and ALC
  - Increased likelihood of functional decline
  - Increased risk of ADR
Co-Morbidity Predictors of Frailty

- Impaired cognition/mood
- Polypharmacy especially sedative use
Co-Morbidity Predictors of Frailty

- Impaired cognition/mood
- Polypharmacy especially sedative use
- Multiple chronic diseases
Number of Chronic Disease more important than Age in determining health care visit numbers (Source CIHI Jan 2011)
Putting them together

- Increased impact of a “illness” on function and ability to cope
- Increased risk of other diseases
- Increased likelihood of hospitalization
- Increased challenges to health care providers
- Increased LOS and costs with worsening of outcomes
Treatment of Frailty

- Prevent dwindles and optimize co-morbidities
  - Early identification of onset of frailty with targeted interventions (promoting healthy aging!)
    - Optimize sensory inputs (hearing and vision)
Treatment of Frailty

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    • Optimize sensory inputs (hearing and vision)
    • Assess cognition and mood
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    - Exercise
Exercise and Aging

- Exercise started at age 35-39 results in 2 years of life gain!
- Exercise started at age 75 results in nearly 1/2 year of life gain!
- Recommend setting aside 30 minutes, three times a week for both stretching and muscle bulk-building exercises
- Focus on “building up quads”
- “Aqua” programs have a place
Treatment of Frailty

Prevent dwindles and optimize co-morbidities
- Early identification of onset of frailty with targeted interventions (promoting healthy aging!)
  - Optimize sensory inputs (hearing and vision)
  - Assess cognition and mood
  - Exercise
  - Nutrition supplement
    - Malnutrition present 3-11% community-dwelling seniors, 15-40% hospitalized seniors and 17-65% of LTC residents
    - Multifactorial causes: physiological changes, diet, finance, cognition, mood, disease
Treatment of Frailty

- Prevent dwindles and optimize co-morbidities
  - Early identification of onset of frailty with targeted interventions (promoting healthy aging!)
    - Optimize sensory inputs (hearing and vision)
    - Assess cognition and mood
    - Exercise
    - Nutrition supplement
    - Vitamin D
      - Vitamin D deficiency is common among community-dwelling elderly among institutionalized elderly, and patients with hip fractures.
      - Vitamin D deficiency is an established risk factor for osteoporosis, falls and fractures.
      - Clinical trials have demonstrated that 800 IU per day of vitamin D and calcium supplementation reduces the risk of falls and fractures.
      - Epidemiological studies links vitamin D insufficiency to breast, prostate and colon cancers, type 2 diabetes, and cardiovascular disorders including hypertension.
Treatment of Frailty

- Prevent dwindles and optimize co-morbidities
  - Early identification of onset of frailty with targeted interventions (promoting healthy aging!)
    - Optimize sensory inputs (hearing and vision)
    - Review cognition and mood
    - Exercise
    - Nutrition supplement
    - Vitamin D
    - Medication review for potential ADR or compliance issues
Treatment of Frailty

- Prevent dwindles and optimize co-morbidities
  - Early identification of onset of frailty with targeted interventions (promoting healthy aging!)
  - Optimize Chronic Disease Management Strategies
Seven steps approach to Aging with Co-morbidities

- Need for targeting to high-risk
- Chronic Disease Management Guidelines appropriate to Elderly
- Customize “best practices” based on patient goals
- Desirability of case management to link effort and care
- Need for “system navigation” and knowledge of system opportunities
- Multiple disciplines and individuals the rule so good communication pathways essential
- Caregiver support is crucial!
Treatment of Frailty

- Prevent dwindles and optimize co-morbidities
- Optimize Chronic Disease Management Strategies
- Early detection of acute illness and polypharmacy

Figure 2. Conceptual model of how risk factors cause frailty.
Treatment of Frailty

- Prevent dwindles and optimize co-morbidities
- Optimize Chronic Disease Management Strategies
- Early detection of acute illness and polypharmacy
- Identify and modify Geriatric Syndromes (Falls, Immobility, Confusion, Depression, Incontinence)
Metabolic Equivalent of Task (METS)

Anything is better than doing nothing!!

- 0.9 MET = sleeping (daily muscle loss of 1.3% to 3%).
- 1.0 MET = sitting
- 1.8 MET = writing, typing, desk work
- 2.3 MET = walking, strolling, (slowly)
- 3.5 MET = light moderate exercise
- 8 MET = jogging
- 10 MET = jumping rope
Challenges to Mobilizing

How many times have you heard?…

- “I need to rest to get stronger first”
- “I’m not going to kitchen group because I need to save myself for physio”
- “I’m afraid of falling”
- “At home the PSW doesn’t do anything for me.”
- “If I can’t go back to my home, there is no point in doing anything. This is all a waste of time.”
Treatment of Frailty

- Prevent dwindles and optimize co-morbidities
- Optimize Chronic Disease Management Strategies
- Early detection of acute illness and polypharmacy
- Identify and modify Geriatric Syndromes (Falls, Immobility, Confusion, Depression, Incontinence)
- Optimize environment
Treatment of Frailty

- Prevent dwindles and optimize co-morbidities
- Optimize Chronic Disease Management Strategies
- Early detection of acute illness and polypharmacy
- Identify and modify Geriatric Syndromes (Falls, Immobility, Confusion, Depression, Incontinence)
- Optimize environment
- Maximize community and socio-economic supports
Joe’s Story

- 86 never married, loner, living in older house
- Retired owner of transportation business
- Complains of ‘cow-boy’ legs with painful limitation of mobility.
- Hasn’t left home in over a year
- PMH DM, OA, HTN, CCF
- Is Joe Frail?

- Fell at home and unable to rise
- Attributes it to meds so he stops them!
Minimize Risk Factors

Review medications and their use
Minimize Risk Factors

Review the environment for potential hazards
Minimize Risk Factors

Health Professionals Goals
• Improve gait and safety
• Modify environment
• Encourage increased activity
• Reduce isolation
• Improve his mood

VS

George’s Goals
• Stay where he is
• Remain in control
• Avoid new expense
That’s All Folks!
Assessment Urgency Algorithm

Background

- Developed in Waterloo
- Responding to need to improve identification of high risk elderly in ER to better target use of GEM and CCAC resources
- Collected data all 75 years olds attending ER using assessment based on 20 categories of information (6 initial screen and 14 clinical evaluation) and outcomes at 90 days
- Developed Assessment Urgency Algorithm (AUA) based on 7 of 20 categories
- Subsequently validated in Hamilton and a number of other Canadian and International sites
Assessment Urgency Algorithm (AUA)
Merits of AUA as high-risk screening tool

- Ontario derived tool validated nationally and internationally
- Predicts risk of 30 day ER re-attendance, 90 day re-admission, increased LOS and ALC likelihood
- Reduced false positives relative TRST/ISAR
- Implicit link to CCAC CA Form
- Paper and electronic format (PDA) versions are available