Frailty:
From the concept to the clinical practice

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University of Nancy, France
Frailty:
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No conflict of interest
Frailty:
From the concept to the clinical practice

- Concept and epidemiology
- Criteria and classifications
- Risks related to frailty
- Detection in clinical practice
Evolution of life expectancy at different ages, over 2 centuries

French data
Evolution of life expectancy at the age of 80
Demographic evolution in the dpt of « Meurthe et Moselle »
Lorraine-France

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>&gt; 60 y.o. (%)</td>
<td>139,742 (19,6%)</td>
<td>143,731 (20,3%)</td>
<td>164,744 (23,5%)</td>
<td>+18%</td>
</tr>
<tr>
<td>&gt; 75 y.o (%)</td>
<td>44,020 (6,2%)</td>
<td>55,915 (7,9%)</td>
<td>63,255 (9,0%)</td>
<td>+44%</td>
</tr>
</tbody>
</table>
Home institutional helps solicited

<table>
<thead>
<tr>
<th>&gt; 60ans</th>
<th>&gt; 75 ans</th>
</tr>
</thead>
<tbody>
<tr>
<td>7,04 %</td>
<td>12,30 %</td>
</tr>
</tbody>
</table>
Frailty

Age-related diseases

Frailty

Hospitalizations - Loss of autonomy - Death
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
Frailty: From the concept to the clinical practice

- Concept and epidemiology
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Frailty: at least 3 of the following criteria

- Weight loss
- Exhaustion
- Weakness
- Slow walking speed
- Diminished physical activity

Increases with age: 3% at 65y; 26% at 85y

Frailty: more than a somatic decline

- Slowness
- Low activity
- Balance
- Weight loss
- Malnutrition
- Sarcopenia
- Osteopenia
- Depression
- Cognitive decline
- Coping
- Social relations
- Social support

Michel JP et al, JAMA, 2008
Gobbens RJJ et al JNHA 2009
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## Risks of Frailty in 3 Years

<table>
<thead>
<tr>
<th>Adverse Geriatric Outcomes</th>
<th>Hazards Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>2.24</td>
</tr>
<tr>
<td>Worsening ADL</td>
<td>1.98</td>
</tr>
<tr>
<td>Worsening Mobility</td>
<td>1.50</td>
</tr>
<tr>
<td>Falling</td>
<td>1.29</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>1.29</td>
</tr>
</tbody>
</table>

Age-adjusted HR for death per 0.1 m/s higher gait speed

<table>
<thead>
<tr>
<th>Study Type</th>
<th>No. of Deaths</th>
<th>Total Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular Health Study, 2011</td>
<td>3851</td>
<td>5801</td>
</tr>
<tr>
<td>Established Populations for the Epidemiologies Study of the Elderly, 1985</td>
<td>1955</td>
<td>2128</td>
</tr>
<tr>
<td>Health, Aging, and Body Composition Study, 2009, 2005</td>
<td>848</td>
<td>3048</td>
</tr>
<tr>
<td>Hispanic Established Populations for Epidemiological Study of the Elderly, 1999</td>
<td>972</td>
<td>1905</td>
</tr>
<tr>
<td>Invecchiare in Chianti, 2000</td>
<td>187</td>
<td>972</td>
</tr>
<tr>
<td>Osteoporotic Fractures in Men, 2005</td>
<td>1073</td>
<td>5833</td>
</tr>
<tr>
<td>Third National Health and Nutrition Examination Study, 2004</td>
<td>2837</td>
<td>3958</td>
</tr>
<tr>
<td>Predicting Elderly Performance, 2003</td>
<td>293</td>
<td>491</td>
</tr>
<tr>
<td>Study of Osteoporotic Fractures, 1990</td>
<td>5512</td>
<td>10349</td>
</tr>
</tbody>
</table>

Pooled (random effects)
Pooled (shared frailty model)

Studenski et al, JAMA 2011;305:50-58
Predicted Median Life Expectancy by Age and Gait Speed (0.1 m/sec)

Studenski et al, JAMA 2011;305:50-58
In older acute care inpatients, MPI score assessed at hospital admission is an independent predictor of in-hospital mortality and the length of hospital stay.

Figure 1. Adjusted (age, gender and disease) survival curves, with 95% confidence interval bands, according to baseline Multidimensional Prognostic Index group.

Risk of one-month and one-year all-cause mortality according to the four frailty instruments in hospitalized older patients.

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>Frailty index</th>
<th>HR</th>
<th>95% CI</th>
<th>p-value**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FI-SOF-1</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FI-SOF-2</td>
<td>1.87</td>
<td>1.27–2.76</td>
<td>0.0016</td>
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<tr>
<td></td>
<td>FI-SOF-3</td>
<td>2.42</td>
<td>1.16–5.04</td>
<td>0.0184</td>
</tr>
<tr>
<td></td>
<td>FI-CD*</td>
<td>1.13</td>
<td>1.10–1.16</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>FI-CGA-1</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-month follow-up</td>
<td>FI-CGA-2</td>
<td>2.92</td>
<td>1.84–4.64</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>FI-CGA-3</td>
<td>4.54</td>
<td>1.68–12.24</td>
<td>0.0028</td>
</tr>
<tr>
<td></td>
<td>MPI-1</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MPI-2</td>
<td>2.05</td>
<td>1.40–3.00</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td>MPI-3</td>
<td>7.70</td>
<td>5.73–10.34</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>FI-SOF-1</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FI-SOF-2</td>
<td>1.67</td>
<td>1.29–2.17</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>FI-SOF-3</td>
<td>2.45</td>
<td>1.44–4.18</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>FI-CD*</td>
<td>1.11</td>
<td>1.09–1.13</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>FI-CGA-1</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-year follow-up</td>
<td>FI-CGA-2</td>
<td>2.93</td>
<td>2.25–3.83</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>FI-CGA-3</td>
<td>4.18</td>
<td>2.10–8.34</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>MPI-1</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MPI-2</td>
<td>2.00</td>
<td>1.64–2.45</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>MPI-3</td>
<td>5.70</td>
<td>4.49–7.22</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Frailty is prevalent in liver transplant candidates. It strongly predicts waitlist mortality, even after adjustment for liver disease severity demonstrating the applicability and importance of the frailty construct in this population.

Figure 1: Proportion of candidates who died or were delisted, by frail status (Fried Frailty score $\geq 3$) and Model for End-Stage Liver Disease (MELD) score category ($<18$ or $\geq 18$).
Hypoglycemia Is Independently Associated with Multidimensional Impairment in Elderly Diabetic Patients

- 1342 patients with type 2 diabetes (DM), 65 years old or over (73.3 ± 5.5 years), and treatment with oral antidiabetic medications.
- Multidimensional impairment was assessed using the MPI evaluating functional, cognitive, and nutritional status; risk of pressure sores; comorbidity; number of drugs taken; and cohabitation status.
- Multivariate analysis showed that advanced age, female gender, hypoglycemic events, and hospitalization for glycemic decompensation were independently associated with a worse MPI score.

Stratification of elderly diabetic patients using the MPI might help to identify those patients at highest risk who need better-tailored treatment.

Pilotto et al; BioMed Research International 2014
Predicted probability of mortality or major morbidity according to gait speed* and the Society of Thoracic Surgeons (STS) Risk Score in subjects undergoing cardiac surgery

* 5m, >6 sec

J Afilalo et al, J. Am. Coll. Cardiol. 2010;56;1668-1676
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How to postpone/avoid frailty?
The exceptional… Ms Calment

- Good luck
- Good genes
- Healthy lifestyle

Jeanne Louise CALMENT
21 Février 1875 - 4 Août 1997
What can be done to detect frailty and prevent functional decline?
PROMOTING ACCESS TO INNOVATION FOR FRAIL OLD PERSONS

IAGG (INTERNATIONAL ASSOCIATION OF GERONTOLOGY AND GERIATRICS), WHO (WORLD HEALTH ORGANIZATION) AND SFGG (SOCIETE FRANCAISE DE GERIATRIE ET DE GERONTOLOGIE) WORKSHOP - ATHENS JANUARY 20-21, 2012

Detection and management of frailty in community living persons

Objectives: To avoid/or delay functional decline preserve as long as possible the patient’s autonomy and delay institutionalization.

Target population: community living individuals over 70 years
Detection and management of frailty in community living persons

4-step approach:

1. Detection of frail people
2. Comprehensive Geriatric Assessment (CGA)
3. Personalized preventive and therapeutic actions
4. Evaluation of the efficacy of the strategy
Step 1- Detection of frail people

1. Inadequate social support, unsuitable housing
2. Absence of social relations
3. Recent decrease in activities, transfer reduction, instability and slow walk speed
4. Environmental and personal negligence
5. Sensorial deficit (non-compensated)
6. Behaviour and cognitive disorders (loss of motivation, cognitive decline, depression)
7. Loss of weight >5% during the last 6 months
8. Polymedication >4 drugs daily
9. Unprogrammed repetitive hospitalisations (>2 during the last 6 months)
10. Falls >2 during the last year.
Step 1- Detection of frail people

Who: Nurse, GP, other care givers

Where: Where elderly people meet health care professionals

Duration: <10 min

- 4/10 of the criteria
- At least 1 during the last 6 months
Step 2- CGA

Who: nurse and physician specialized in geriatric medicine,
Where: In primary care centers
Duration: 2 hours
Step 2- CGA by nurse

- Pain 3 min
- Nutrition : MNA 12 min
- Gait and walk speed: 10 min
- Autonomy evaluation ADL-IADL 5 min
- Environment, housing, family, social net 10-15 min
- Evaluation of physical and social activities 10-15 min

Duration: about 1h
Step 2 - CGA by the physician

Physical examination 20 min
Cognitive functions evaluation:
MMSE, 5 words 10 min
Mood: GDS 15 items 10 min
Drug Prescription reevaluation 10 min
Synthesis, elaboration personalized care plan 15 min

Duration: about 1h
Step 3- Personalized care plan according to the results of the CGA

Who: Specialist physician who performed the CGA in accordance with the GP of the individual.

Where: Memory clinic, Physiotherapist, Nutritionist, Psychologist, Social services, etc...
Step 4: Validation of the procedure

The medical, social, economic and ethical aspects of this procedure will be evaluated after a period of 1 year.

The criteria for this evaluation have been defined by the clinical research unit of our university hospital.
Detection and management of frail community living persons in Lorraine

CHU Nancy, ARS, OHS, CARMI, SANOFI
Detection and management of frail subjects

THM

1- Detection of frailty and CGA are useful in order to:
   a- evaluate the risks of functional decline, morbidity and mortality
   b- define the risk/benefit balance of therapeutic strategies
   c- propose specific actions to prevent or regress frailty

2- This new holistic approach is impossible without the collaboration of several health professionals.