Latest achievement in the care for elderly

Geriatric medicine

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Age is chronological age

- Functionnal age or physiological age refers to a « normal aging » about which we know very few in human or to a « young condition »
- Quality of the aging process depends on
  - Intrinsic factors linked to genetic
  - Extrinsic factors
    - Way of living
    - Exposition to noise, sun, smoking, alcohol, stress..
  - Diseases
- In social life, we belong to our range of age

The illness trajectory of elderly cancer patients across cultures
– SIOG position paper A.Surbone
What is the meaning of « old »

• Culture defines the meaning of old
• Patients and doctors share a common ethnic culture
• But medicine in itself is a culture
• and socialises its members to think and act in particular ways

Goya
The old women

Picasso
The old guitarist
How to define « normal aging » ?

How do we define abnormality in aging ?

– Statistical definition ?
  • Aging is caracterised by an increased variability of all biological and clinical parameters
    – 60% of women > 80 yrs have cognitive troubles
    – Is it normal ageing ?

– Need of a beneficial treatment ?
  – Example : hypertension

– Illness definition varies with age
  – Osteoporosis
  – Arthrosis
  – Impaired renal function or chronic renal failure ?
## Prevalence of GFR ranges


<table>
<thead>
<tr>
<th>FG ml/mn/1.73 m</th>
<th>20-39 years</th>
<th>40-59 years</th>
<th>60-69 years</th>
<th>&gt;70 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 90</td>
<td>86 %</td>
<td>55.7 %</td>
<td>38.5 %</td>
<td>25.5 %</td>
</tr>
<tr>
<td>60-89</td>
<td>13.7 %</td>
<td>42.7 %</td>
<td>53.8 %</td>
<td>48.5 %</td>
</tr>
<tr>
<td>30-59</td>
<td>1.8 %</td>
<td>7.1 %</td>
<td>24.6 %</td>
<td></td>
</tr>
<tr>
<td>15-29</td>
<td></td>
<td></td>
<td></td>
<td>1.3 %</td>
</tr>
</tbody>
</table>

Estimation of GFR by MDRD - N : 15000
<table>
<thead>
<tr>
<th>GFR function of age</th>
<th>MDRD / Cockcroft</th>
<th>3 C survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>65-69 yrs</td>
<td>70-74 yrs</td>
</tr>
<tr>
<td></td>
<td>n=2068</td>
<td>n=2834</td>
</tr>
<tr>
<td></td>
<td>2063</td>
<td>2829</td>
</tr>
<tr>
<td>GFR ml/mn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 90</td>
<td>16.2</td>
<td>14.0</td>
</tr>
<tr>
<td>60-89</td>
<td>72.5</td>
<td>71.2</td>
</tr>
<tr>
<td>30-59</td>
<td>11.1</td>
<td>14.4</td>
</tr>
<tr>
<td>15-29</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>GFR moy</td>
<td>ml/mn</td>
<td>ml/mn</td>
</tr>
<tr>
<td>MDRD</td>
<td>76.1</td>
<td>74.7</td>
</tr>
<tr>
<td>Cockroft</td>
<td>70.6</td>
<td>65.6</td>
</tr>
</tbody>
</table>
Renal aging
Glomerular Filtration Rate

• Patients hospitalised in Geriatrics for non nephrological reasons
  n : 544 - Age : 84.8 +/- 6.4 years
  Ccréat = 33 +/- 14 ml/mn

Charmes, 1996
Normal aging
View from animal models

Renal aging

- Control of the genetic factors
  - Rats Wag/Rij
  - No hypertension / No renal diseases (hydronephrosis)
- Control of the environmental factors
  - Diet / Germ-free atmosphere
- Renal biopsies in rats aged 6, 12, 18, 24 months
- Very few anatomical modifications
  - Interstitial fibrosis
  - Small thickening of the glomerular membrane
- Very few functionnal impairment
  - Small decrease in renal blood flow and GFR
- But limitation of these modifications by ACE inhibitors *(April study)*
Normal aging in normal life

• Genetic factors not controlled – Different phenotypes
• Environmental factors
  • Climate, sun
  • Quality of the air and water
  • Hygiene of life
  • Working conditions
  • Diet
  • Smoking
  • Cardiovascular risk factors …

Responsible of the increased life expectancy in XX°century
More than a duality young/old, there is a continuum between youth and old age as it is between health and disease.
Frailty

Jeanne Calment
1875 -1997
Frailty
Definition

• Patients with poor overall health
• High risk for
  – worsened morbidity
  – worsened disability
  – mortality
• Controversies for a single definition
  – Biological definition phenotypes
  – Clinical definition : index of frailty
  – Evolutive conception of frailty
Frailty: single entity independent and distinct from disease and disability

Molecular & disease
- Oxydative stress
- Mitochondrial deletions
- Shortened telomeres
- DNA damage
- Cell senescence

Gene variations

Inflammation
- Neuroendocrine dysregulation
- IL6 – IGF-1 - DHEA - Sex steroids
- Anorexia
- Sarcopenia
- Immune function
- Cognition
- Clotting
- Glucose metabolism

Impaired physiological

Clinical
- Slowness
- Weakness
- Weight loss
- Low activity
- Fatigue

Walston J. JAGS 2006
The frailty cycle
Walston J, JAGS 2006

- Aging
  - Decreased taste
  - Poor dentition
  - Dementia & depression
  - Chronic illness
  - Multiple hospitalisation

- Chronic illness & acute illness
  - Medications
  - Successful life events
  - Falls

- Chronic malnutrition

- Decreased appetite

- Chronic metabolic rate and activity

- Sarcopenia
  - Decreased strength
  - Decreased Insulin Sensitivity

- Osteopenia

- Immobility & dependency
  - Impaired balance & falls
Criteria used to be frail

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss</td>
<td>Weight loss in Height &lt; 173</td>
<td>&gt; 5%</td>
</tr>
<tr>
<td></td>
<td>Height &lt; 173</td>
<td>Height &lt; 159</td>
</tr>
<tr>
<td></td>
<td>BMI &lt; 24</td>
<td>&gt; 7 s</td>
</tr>
<tr>
<td></td>
<td>BMI 24-26</td>
<td>&gt; 6s</td>
</tr>
<tr>
<td></td>
<td>BMI 26-28</td>
<td>&lt; 29</td>
</tr>
<tr>
<td></td>
<td>BMI &gt; 28</td>
<td>&lt; 30</td>
</tr>
<tr>
<td></td>
<td>&lt; 383 kcal/wk</td>
<td>&lt; 30</td>
</tr>
<tr>
<td></td>
<td>on either</td>
<td>&lt; 32</td>
</tr>
<tr>
<td>15-Foot Walk Time</td>
<td>Score 2 or 3</td>
<td>Question on</td>
</tr>
<tr>
<td></td>
<td></td>
<td>➤ CES-D</td>
</tr>
<tr>
<td>Grip strength</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhaustion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Clinical examples of frailty

• Delirium after surgery and anesthesia
  – Central nervous system
  – Sympathetic nervous system
  – Endocrine systems response (pituitary, adrenal)
  – Innate immune system response

• Falls
  – Failure to adapt to neuromuscular stressors
Cancer cachexia
Fearon K. Am J Clin Nutr 2006;83:1345-50

- Weight loss is not a good definition for cachexia
- A 3-factor profile relates better to adverse functional aspects of cachexia and to patients survival
  - Weight loss > 10%
  - Low food intake < 1500 kcal/day
  - C-reactive proteine >10mg/l
- Population: 170 unresectable pancreatic cancer
  - 67.9+/-.3 yrs
- Shortened survival applies to cachectic patients with localized diseases
Cachexia in elderly
Mini Nutritional Assessment

• MNA includes functional assessment, semi-quantification of food intake, anthropometric parameters and medical conditions

• MNA is a predictive independant factor of 3-months mortality in a cohort of 364 older patients (79) with disseminated cancers undergoing chimiotherapy

Soubeyran P. et al, 2006
Treatment

• Prevention of sarcopenia
  • Muscle strengthening exercises
    – 30-60 min X 3 / week 3-6 months
      (Gill, N Engl J Med 2002)
  • Nutrition and exercise
  • Testosterone & DHEA replacement: no benefit on sarcopenia (Morley, 2005)

• Positive attitude (Ostir, 2004)

• Prevention or optimal management of illnesses
French exemple of positive attitude during retirement
Chronic diseases in elderly

- Heart diseases
- Alzheimer and other dementias
- Diabetes
- Cancers
- Chronic lung diseases
- Musculo-skeletal conditions
- Strokes
- Psychiatric problems
Geriatric conditions

- Falls resulting in injury
- Incontinence requiring pads
- Low BMI < 18.5 kg/m2
- Dizziness
- Vision impairment
- Hearing impairment
- Cognitive impairment
Geriatric syndromes
Unifying conceptual model

GERIATRIC SYNDROMES
- Incontinence
- Falls
- Pressure ulcers
- Delirium
- Functional decline

FRAILTY

POOR OUTCOME
- Disability
- Dependence
- Nursing home
- Death

Shared Risk factors

S.K. Inouye JAGS 2007
Pathophysiology of geriatric syndromes

A - Linear
Risk factor
Early disease
Advanced disease

B - Concentric
Risk factor A
Risk factor B
Risk factor C
Risk factor D

C - Interactive Concentric
Risk factor synergism

Clinical phenotype
New conceptual models
## Risk factors for geriatric syndromes

<table>
<thead>
<tr>
<th>Geriatric syndromes</th>
<th>Number of risk factors</th>
<th>Shared risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure ulcers</td>
<td>12</td>
<td>♠ Older age</td>
</tr>
<tr>
<td>Incontinence</td>
<td>9</td>
<td>♠ Functionnal impairment</td>
</tr>
<tr>
<td>Falls</td>
<td>12</td>
<td>♠ Cognitive impairment</td>
</tr>
<tr>
<td>Functional decline</td>
<td>12</td>
<td>♠ Impaired mobility</td>
</tr>
<tr>
<td>Delirium</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

Systematic review of the medical litterature 1990-2005

*S.K.Inouye. JAGS 2007;55:780-791*
What are we able to do?

Oncologists
and Geriatricians
Step 1: screening the patients needing a geriatric assessment

- Risk factors for frailty
- Index of mortality
  - in community old population → decision of treatment
  - In old cancer patients
<table>
<thead>
<tr>
<th>4-year mortality index for older adults</th>
<th>Lee SJ. JAMA 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 60-64</td>
<td>1</td>
</tr>
<tr>
<td>Age 65-69</td>
<td>2</td>
</tr>
<tr>
<td>Age 70-74</td>
<td>3</td>
</tr>
<tr>
<td>Age 75-79</td>
<td>4</td>
</tr>
<tr>
<td>Age 80-84</td>
<td>5</td>
</tr>
<tr>
<td>Age &gt;85</td>
<td>6</td>
</tr>
<tr>
<td>Sex Male</td>
<td></td>
</tr>
<tr>
<td>BMI &lt; 25</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1</td>
</tr>
<tr>
<td>Cancer</td>
<td>2</td>
</tr>
<tr>
<td>Chronic lung disease limiting activity</td>
<td>2</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>2</td>
</tr>
<tr>
<td>Current smoking</td>
<td>2</td>
</tr>
<tr>
<td>Difficulty in bathing (showering)</td>
<td>2</td>
</tr>
<tr>
<td>Difficulty in managing money</td>
<td>2</td>
</tr>
<tr>
<td>Difficulty in walking several blocks</td>
<td>2</td>
</tr>
<tr>
<td>Difficulty in pushing or pulling large objects</td>
<td>1</td>
</tr>
<tr>
<td>Maximum Score</td>
<td>25</td>
</tr>
</tbody>
</table>
Step 2 : What type of geriatric assessment?

- Comprehensive Geriatric Assessment has been validated in old populations.
- Part of patients with Cancer referred to oncologists may constitute a younger (65-75yrs) and fitter group necessitating a more specific evaluation.
- Functional reserve / functional status.

*Hurria A, Cancer 2005*
Clinical Assessment Measures Selected Based on Reliability, Validity, Brevity and Prognostic Value


<table>
<thead>
<tr>
<th>Domain</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Status</td>
<td>ADL</td>
</tr>
<tr>
<td></td>
<td>IADL</td>
</tr>
<tr>
<td></td>
<td>KPS patient-rated</td>
</tr>
<tr>
<td></td>
<td>KPS Physician-rated</td>
</tr>
<tr>
<td></td>
<td>Timed Up and Go</td>
</tr>
<tr>
<td></td>
<td>Number of falls in last 6 months</td>
</tr>
<tr>
<td>Comorbidity</td>
<td>Physical Health Section</td>
</tr>
<tr>
<td>Cognition</td>
<td>Blessed scale</td>
</tr>
<tr>
<td>Psychological</td>
<td>Hospital Anxiety and Depression scale</td>
</tr>
<tr>
<td>Social Functioning</td>
<td>Medical Outcomes Study Social Activity Limitations Measures</td>
</tr>
<tr>
<td>Social Support</td>
<td>Medical Outcomes Study Social Support Survey</td>
</tr>
<tr>
<td></td>
<td>Seeman and Berkman Social Ties</td>
</tr>
<tr>
<td></td>
<td>BMI</td>
</tr>
<tr>
<td></td>
<td>% unintentional weight loss in the last six months</td>
</tr>
</tbody>
</table>
Step 3 : prevention during cancer treatment

- Delirium
- Falls
- Incontinence
- Cachexia
- Disabilities

- HELP Inouye 2000
- Multi risk factor intervention
- Assessment of oral intakes
- Nutritional support
- Adapted physical exercise

INOGAD: Randomised interventional study of nutritional support in patients over 75 yrs receiving chemotherapy and being at risk of denutrition.
Step 4: evaluation of geriatric assessment in patients with cancer

- Decision to treat
- Decreased short term mortality?
- Less side effects of treatments?
- Increased quality of life?
Take home message

• Age is chronological age
• Frailty, geriatric syndromes and geriatric conditions must be searched for
• Cancer is a risk factor for frailty
• Screening the patients to go to geriatric assessment must be simple
• Evaluation of geriatric assessment and interventions must be done
IAG Congress

PARIS July 2009

www.gerontology2009.org