Management of co-morbidities in the geriatric patient

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Take away points

Fragility fracture patients have many comorbidities

Comorbidity helps predict outcomes & prognosis

Charlson score is an easy tool to measure comorbidity

A few “pearls” for most common diseases
Growing proportion of elderly in US population

Number of people age 65 and over, by age group, selected years 1900–2006 and projected 2010–2050

Note: Data for 2010–2050 are projections of the population.
Reference population: These data refer to the resident population.
Comorbidities in the elderly

Percentage of people age 65 and over who reported having selected chronic conditions, by sex, 2005–2006

<table>
<thead>
<tr>
<th>Condition</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart disease</td>
<td>37</td>
<td>26</td>
</tr>
<tr>
<td>Hypertension</td>
<td>52</td>
<td>54</td>
</tr>
<tr>
<td>Stroke</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Asthma</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Chronic bronchitis or Emphysema</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Any cancer</td>
<td>24</td>
<td>19</td>
</tr>
<tr>
<td>Diabetes</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>Arthritis</td>
<td>43</td>
<td>54</td>
</tr>
</tbody>
</table>

Note: Data are based on a 2-year average from 2005–2006.
Reference population: These data refer to the civilian noninstitutionalized population.
Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.
Chronic Disease Burden

• 82% of elderly have at least 1 chronic disease
  – 65% have 2 or more chronic diseases

• Chronic disease burden increases with increasing age

Wolff Arch Intern Med 2002
# Impact of aging on the surgery workforce

<table>
<thead>
<tr>
<th>Proportion of work within surgical specialty by age group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Cardiothoracic&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>General surgery&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Neurosurgery</td>
</tr>
<tr>
<td>Ophthalmology</td>
</tr>
<tr>
<td><strong>Orthopedic surgery</strong></td>
</tr>
<tr>
<td>Otolaryngology</td>
</tr>
<tr>
<td>Urology</td>
</tr>
</tbody>
</table>

Source: NHDS and NSAS 1996

<sup>a</sup>In the 1996 NHDS sample, the incidence rate for specific cardiothoracic procedures in pediatric patients was too small to allow an accurate incidence rate

<sup>b</sup>Category includes vascular, breast, hernia, abdominal, gastrointestinal, and pediatric procedures
... all the other medical problems present other than the presenting or chief complain (i.e. the fracture)
Comorbidity
All the pre-existing medical problems

Morbidity
Acquired complications after presenting

Mortality
Death after presenting
Why we investigate comorbidity

- Risk of death/mortality
- Risk of complications
- Optimizing goals of care
- May enhance reimbursement
- Outcomes may be adjusted for disease severity
What proportion of FFP do not have any comorbidities?

A. none
B. Less than 10%
C. 10-30%
D. 30-50%
Charlson comorbidity index

One of the most common and simple to use

19 comorbidities most useful in predicting death

Designed and validated for hospitalized patients
Comorbidities with Charlson index

- Ulcer disease
- Peripheral vascular disease
- Chronic pulmonary disease
- Hemiplegia
- Congestive heart failure
- Cerebrovascular disease
- Myocardial infract
- Any tumor
- Diabetes
- AIDS

- Dementia
- Diabetes (end organ damage)
- Renal disease (mod-sev)
- Connective tissue disease
- Leukemia
- Lymphoma
- Metastatic tumor
- Liver disease (mild)
- Liver disease (mod-sev)
Charlson Index

Weighted score: 1 year mortality rate for hospitalized patients

“0”, 3.8%

“1-2”, 8.9%

“3-4”, 17.5%

“≥ 5”, 32.8%
Criteria of frailty

Gait velocity

Grip strength

Exhaustion

Weight loss

Chin: low BMI, inactivity plus 1 other criterion
Fried: ≥ 3 criteria
Klein: unable to stand without help, low peak expiratory flow rate, ≥ 4 criteria
Lachs: impairment of mobility, hearing, lack of social support, disability, ≥ 1 criterion
Rockwood: unable to walk without help, unable to perform ADLs, ≥ 1 criterion

Time versus preoperative optimization
Recommendation: operation as soon as possible

What is a stable patient?

- free of clinical symptoms (dyspnea, confusion)
- normal laboratory tests
- no frailty, no sarcopenia
- number of medication
Comorbidities of patients with hip fractures

The elderly patient falls as a consequence of his multi-morbidity

We consider them as unstable, until we have proved the opposite

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td>32.9%</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>22.7%</td>
</tr>
<tr>
<td>COPD</td>
<td>11.9%</td>
</tr>
<tr>
<td>Ulcera</td>
<td>13.4%</td>
</tr>
<tr>
<td>Renal failure (mod-sev)</td>
<td>11.7%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>16.8%</td>
</tr>
<tr>
<td>Cancer</td>
<td>9.6%</td>
</tr>
</tbody>
</table>
Medication

The **more medications** the higher the probability that you have to deal with an unstable patient

<table>
<thead>
<tr>
<th>Go-list</th>
<th>Stop-list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-blockers, ACE inhibitors, Ca channel blockers, angiotensin-II receptor blockers</td>
<td>Diuretics (on the day of operation)</td>
</tr>
<tr>
<td>H2-blockers, proton pump inhibitors</td>
<td>Theophylline, metformin</td>
</tr>
<tr>
<td>Beta-agonists, anticholinergics, glucocorticoids</td>
<td>NSAID, incl COX-2-inhibitors, allopurinol</td>
</tr>
<tr>
<td>Thyroid hormones, methotrexate</td>
<td>Tricyclic antidepressants, MAO-inhibitors</td>
</tr>
<tr>
<td>Antipsychotics, benzodiazepines</td>
<td>Oral anticoagulation (switch to heparin)</td>
</tr>
<tr>
<td>Opioids, metamizole</td>
<td>a-blockers</td>
</tr>
<tr>
<td>Antiepileptic's, dopaminagonists</td>
<td></td>
</tr>
</tbody>
</table>
Clinical Predictors of Perioperative Cardiac Risk

**Major**
- Acute MI < 7 days
- Recent MI (> 7 days but < 1 month)
- Unstable or severe angina
- Large ischemic burden by symptoms or noninvasive testing
- Decompensated CHF
- Significant arrhythmias (high-grade AV block, SVT)
- Severe valvular disease

**Intermediate**
- Mild angina
- Remote prior MI
- Compensated heart failure
- Creatinine > 2.0 mg/dL
- Diabetes mellitus

**Low**
- **Advanced age**
- Abnormal ECG
- Rhythm other than sinus
- Low functional capacity
- History of stroke
- Uncontrolled systemic hypertension
Congestive heart failure

Caution with fluid balance

Diuresis when fluid overloaded

Control pain

“pearls”
- follow entire pt-not just lung exam
- no use of b-blockers
- all bed bound patient have crackles
- many have pre-existing hypoxia
Coronary artery disease

Baseline and old ECG
Beta-blockers if possible
Control blood pressure & heart rate
Avoid hypoxia
Maintain Hb
Control pain

high risk of MI is 24-72 hours
- probably to thrombotic event
- or plaque rupture

Early anticoagulation may help
Elevated blood pressure

4-times increased risk of complications
Goal: BP <140 mmHg, up to 170/110
a delay of operation not necessary

Other causes of ↑ BP
Pain, agitation, hypoxia, urinary retention

Indication for treatment: systolic 180/diastolic 110
Treatment: Urapidil 12.5 mg slowly
Diabetes

History: type I or II, insulin dependent or not
ECG: look for silent myocardial infraction
Keep aware renal function
Glucose > 200mg% = high risk for infection

“Pearls”

- fluid balance & electrolytes
- avoid ketoacidosis
- avoid hyper and hypoglycemia
Renal disease

Assess volume status
- often dehydration is present

Avoid offending drugs
- non steroidal anti-inflammatory drugs

Avoid large changes in blood pressure

If need fluids, then hold diuretics
Hyperton Dehydration

1.1%-2.9% in geriatric patients
5.3% in patients over 85 years
50% develops dehydration during hospitalization
Mortality rate 30%
Avoid hypernatriemia

Goal: ad free water
How much?

Water deficiency: \( [(Na - 140)/140] \times 0.55 \times KG \)

for example: Natrium 154, 78kg KG

\[
\text{water deficiency} = [(154 - 140)] \times 0.55 \times 78 \quad \Rightarrow 600ml
\]

Therapy: use 5% Glucose
Infusion rate under 500ml/h
COPD

Pulmonary function
FEV1 < 70%
FVC < 70%
FEV1/FVC ratio < 65%

Treatment options:
- Ipratropiumbromid (Atrovent)
- Tiopropium (Spiriva)
- Fenoterol (Berodual)
- Glucorticoids
In-Hospital Delirium

- 40%-60% prevalence
- Persisted in 32% at 1 month post-op
- Associated with worse outcomes
  - Falls
  - Incontinence
  - Delayed recovery
  - Prolonged length of stay

Givens JAGS 2008
Mercantonio JAGS 2000
McGory Annals of Surgery 2009
Confusion Assessment Method (CAM)

- **Hallmark findings** are:
  1. Acute onset and fluctuating course
  2. Inattention
  3. Disorganized thinking
  4. Altered level of consciousness

- The diagnosis of delirium by CAM requires the presence of features 1 and 2 and either 3 or 4

- Sensitivity 94%–100%, specificity 90%–95%

- Conduct daily screening for the first 5 inpatient days after surgery

Inouye Ann Intern Med 1990
Delirium: a Geriatric syndrome

RISK FACTORS
>80 years of age
Dementia
Functional impairments
Sensory deficits
Multiple comorbidities
Meperidine

INTERVENTIONS
Electrolytes/fluid
Oxygen
Treat infections
Treat urinary retention
Treat constipation
 Manage pain
Geriatric consultation

Inouye Ann Intern Med 1993
Siddiqi Cochrane Database Sys Rev 2007
McGory Annals of Surgery 2009
Impact of geriatrics consultation on delirium

Geriatric components of the protocol

• Pain assessment
• Medication reconciliation
• Bowel and bladder function
• Nutrition
• Mobilization
• Environmental stimuli
• Agitation

Marcantonio et. al. JAGS. 2001; 49: 516-522
Impact of geriatrics consultation on delirium

- Cumulative incidence of delirium reduced by 1/3 (50% to 32% intervention arm)

- Incidence of severe delirium reduced by 50% (29% to 12% intervention arm)

Marcantonio et. al. JAGS. 2001; 49: 516-522
Summary

- Almost all fragility fracture patients have significant comorbidities
- Most benefit from co-management
- Assessing comorbidity is important
- Keeping in mind a few pearls may be helpfull
Summary

• BED is bad!

• By waiting for the operation the clinical situation doesn’t get better

• If you indicate a delay of the surgery, you have to fix a clear goal

• “Prognosis are very difficult, particularly if they concern the future”