

# Management of co-morbidities in the geriatric patient



Andreas Panagopoulos MD, Ph.D  
Assistant Professor in Orthopedics  
Patras University Hospital

# Take away points

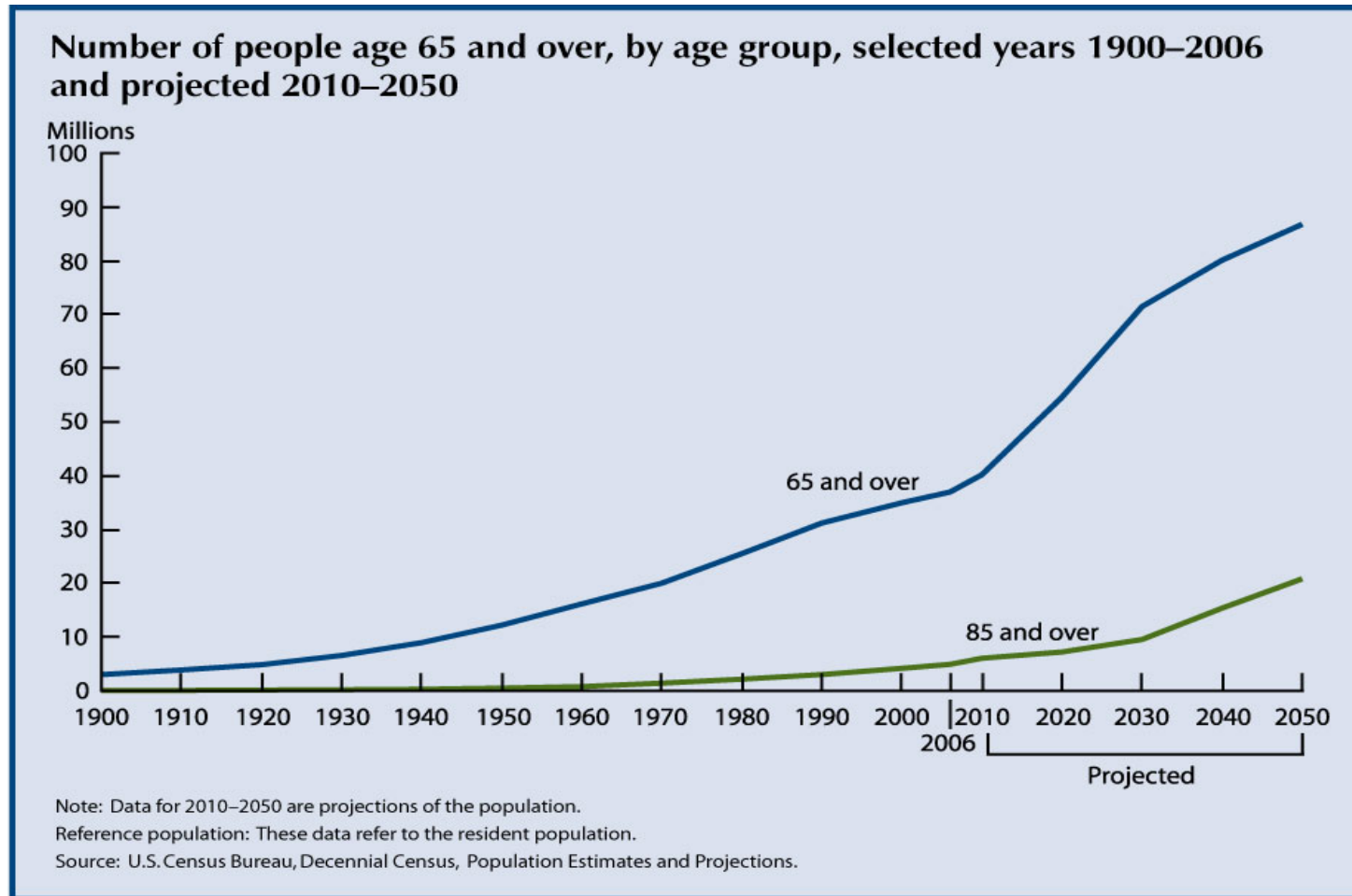
Fragility fracture patients have many comorbidities

Comorbidity helps predict outcomes & prognosis

Charlson score is an easy tool to measure comorbidity

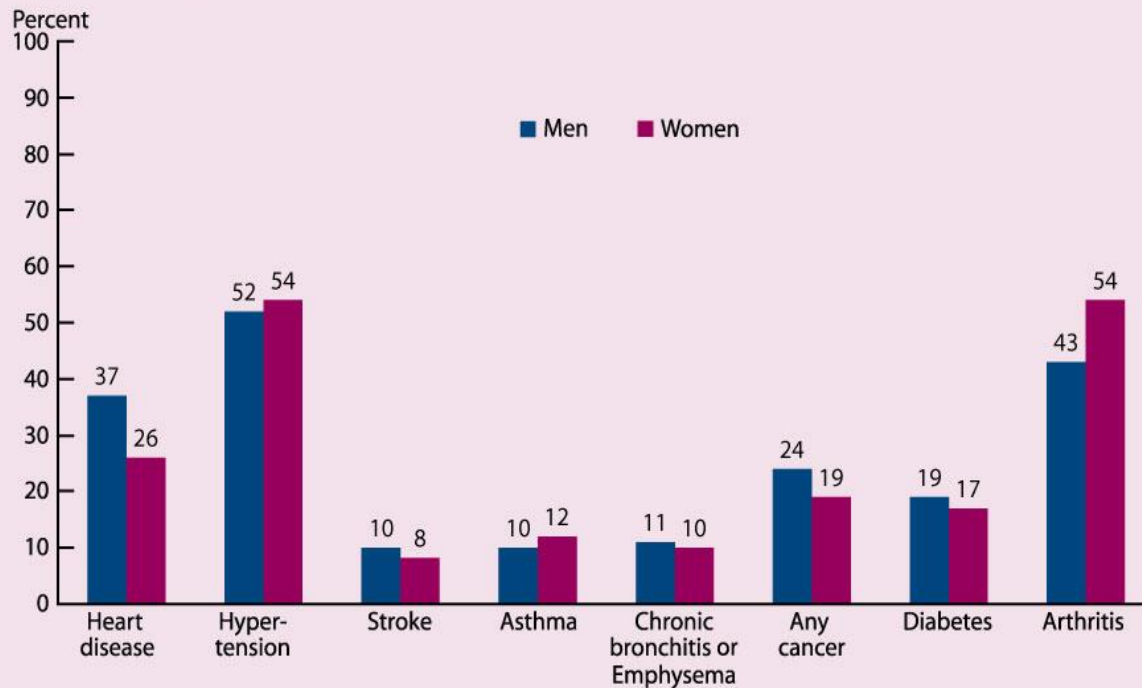
A few “pearls” for most common diseases

# Growing proportion of elderly in US population



# Comorbidities in the elderly

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



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

Proportion of work within surgical specialty by age group				
	<15 y	15–44 yr	45–64 yr	65+ yr
Cardiothoracic <sup>a</sup>	0%	0.3%	29.4%	70.3%
General surgery <sup>b</sup>	2.6%	12.3%	25.5%	59.6%
Neurosurgery	2.8%	12.9%	39.1%	45.2%
Ophthalmology	0.6%	0.7%	10.8%	88.0%
<b>Orthopedic surgery</b>	<b>0.6%</b>	<b>16.1%</b>	<b>31.8%</b>	<b>51.4%</b>
Otolaryngology	39.6%	22.1%	29.9%	8.4%
Urology	4.0%	6.3%	24.9%	64.8%

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

# Definition

... all the other medical problems present other than  
the presenting or chief complain (i.e. the fracture)

## **Comorbidity**

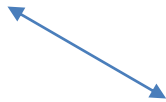
All the pre-existing  
medical problems

## **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 infarct

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%

points	Mortality	Comorbidity-Index
0	3,8 %	no other disease
1-2	8,9 %	mild to moderate
3-4	17,5 %	moderate to severe
>=5	32,8 %	very severe

comorbidity	points
Myocardial infarction	1
Heart failrue	1
PAVK	1
Dementia	1
Cerebrovascula disease	1
COPD	1
rheumatism	1
ulcera	1
Mild liver disease	1
Diabetes (without consecutiv symptoms)	1
Diabetes (wtih consecutiv symptoms)	2
Hemiplegia	2
Moderate to severe renal failure	2
Tumor	2
Leucemia	2
Lymphoma, multiples Myelom	2
Moderate to severe liver disease	3
Metestasis	6
AIDS	6

# Criteria of frailty

Gait velocity

Grip strength

Exhaustion

Weight loss

Study	Gait Velocity	Grip Strength	Exhaustion	Inactivity	Weight Loss	Cognitive Impairment	Visual Impairment	Incontinence
Chin <sup>5</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fried et al <sup>54</sup>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Klein <sup>7</sup>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Lachs <sup>55</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rockwood <sup>56</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Chin: low BMI, inactivity plus 1 other criterion

Fried:  $\geq 3$  criteria

Klein: unable to stand without help, low peak expiratory flow rate,  $\geq 4$  criteria

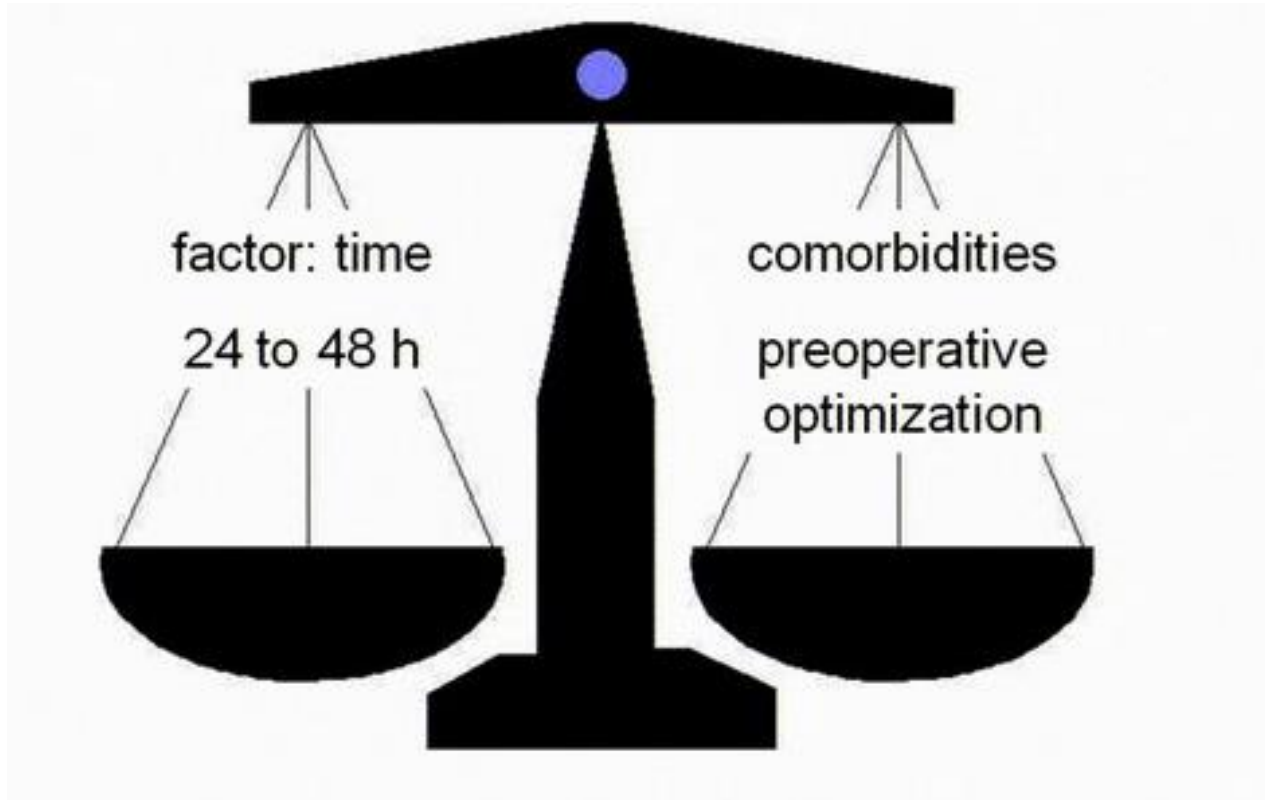
Lachs: impairment of mobility, hearing, lack of social support, disability,  $\geq 1$  criterion

Rockwood: unable to walk without help, unable to perform ADLs,  $\geq 1$  criterion



Afilalo J, Karunanathan S, Eisenberg MJ, Alexander KP, Bergman H. Role of Frailty in Patients with Cardiovascular Disease. *Am J Cardiol.* 2009 Jun 1;103(11):1616-21

# 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

Heart failure	32.9%
Cerebrovascular disease	22.7%
COPD	11.9%
Ulcers	13.4%
Renal failure (mod-sev)	11.7%
Diabetes	16.8%
Cancer	9.6%

# Medication

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

Go-list	Stop-list
Beta-blockers, ACE inhibitors, Ca channel blockers, angiotensin-II receptor blockers	Diuretics (on the day of operation)
H2-blockers, proton pump inhibitors	Theophylline, metformin
Beta-agonists, anticholinergics, glucocorticoids	NSAID, incl COX-2-inhibitors, allopurinol
Thyroid hormones, methotrexate	Tricyclic antidepressants, MAO-inhibitors
Antipsychotics, benzodiazepines	Oral anticoagulation (switch to heparin)
Opioids, metamizole	a-blockers
Antiepileptic's, dopaminagonists	

# 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

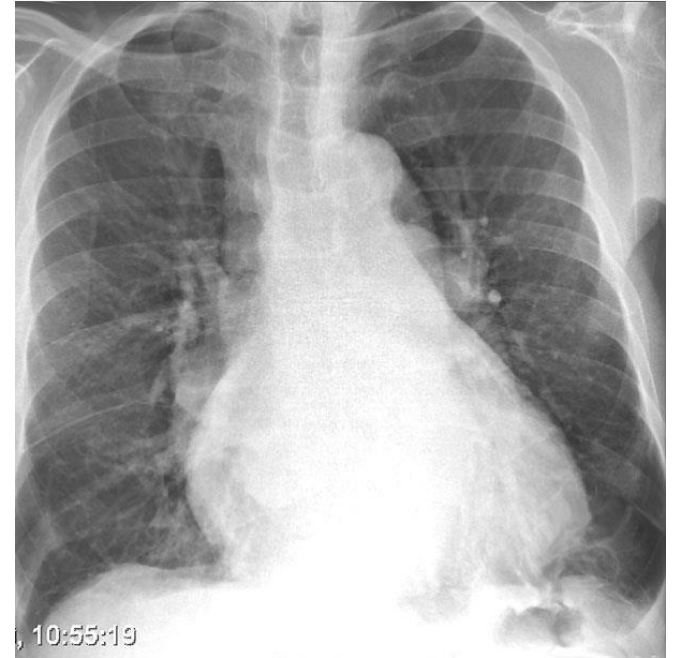
Caution with fluid balance

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**

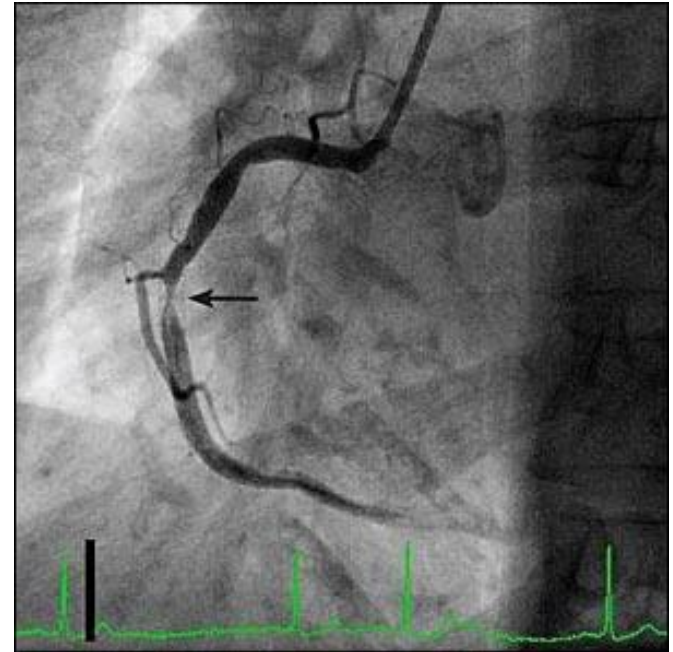
**Maintain Hb**

**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 hypernatremia

Goal: ad free water

How much?

Water deficiency:  $= [(Na - 140)/140] \times 0,55 \times KG$

for example: Natrium 154, 78kg KG

water deficiency  $= [(154 - 140)] \times 0,55 \times 78 \Rightarrow 600ml$

Therapy:

use 5% Glucose

Infusion rate under 500ml/h

# COPD

Pulmonary function

$FEV_1 < 70\%$

$FVC < 70\%$

$FEV_1/FVC \text{ ratio} < 65\%$

Treatment options:

- Ipratropiumbromid (Atrovent)
- Tiotropium (Spiriva)
- Fenoterol (Berodual)
- Glucocorticoids



# 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

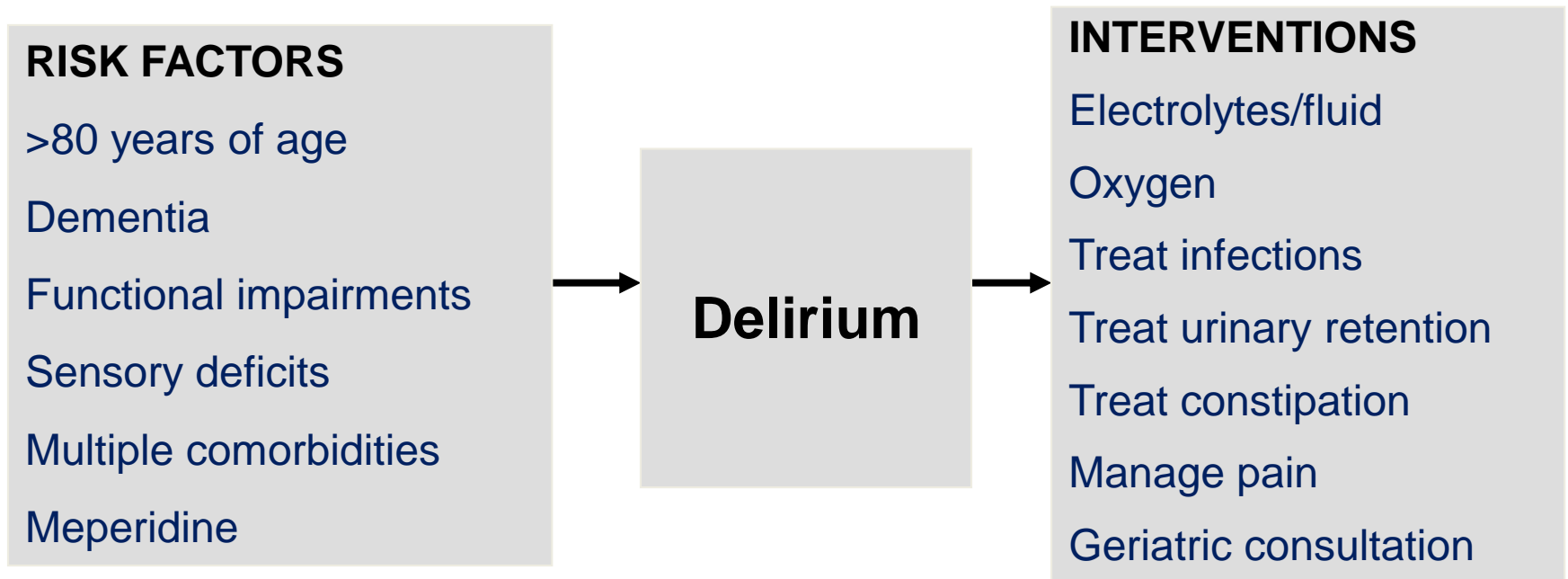
# Confusion Assessment Method (CAM)

- **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

McGory Ann Surg 2009

# Delirium: a Geriatric syndrome



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

# 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)

# 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 helpful



# 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”*

