

Delirium in Older Persons: Clinical Pearls and Pitfalls

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What do we know about delirium?

(Acute confusional state)

DSM5 CRITERIA FOR DELIRIUM

- Disturbance in attention and awareness (reduced orientation to the environment)
- Disturbance develops acutely and tends to fluctuate
- An additional disturbance in cognition, (e.g., memory deficit, language, visuoperceptual)
- Not better explained by a preexisting dementia
- Not in face of severely reduced level of arousal or coma
- Evidence of an underlying organic etiology or multiple etiologies

Used with permission. American Psychiatric Association, 2013

In U.S. hospitals today

***5 older patients become
delirious every minute***

2.6 million older adults develop delirium each year

Why is delirium important?

- Common problem
- Serious complications
- Often unrecognized
- Typically multifactorial etiology
- Up to 40% cases preventable

Delirium is common

Delirium Rates

Hospital:

- Prevalence (on admission) 14-24%
- Incidence (in hospital) 6-56%

Postoperative: 15-53%

Intensive care unit: 70-87%

Nursing home/post-acute care: 20-60%

Palliative care: up to 80%

Mortality

Hospital mortality: 22-76%

One-year mortality: 35-40%

Ref: Inouye SK, NEJM 2006;354:1157-65;
Lancet 2014; 383:911-922

Delirium has serious complications

- Delirium associated with:
 - Increased morbidity and mortality
 - Functional and cognitive decline
 - Increased rates of dementia
 - Institutionalization
 - Increased LOS and healthcare costs
 - Post-traumatic stress disorder
 - Caregiver burden

Adverse Outcomes with Delirium

Outcome	Rate When Delirium:		No. Studies	Risk (95% CI)
	Present n/N (%)	Absent n/N (%)		
Mortality	217/714 (30%)	616/2243 (27%)	7	HR= 2.0 (1.5-2.5)
Institutionalization	176/527 (33%)	219/2052 (11%)	9	OR=2.4 (1.8-3.3)
Dementia	35/56 (63%)	15/185 (8%)	2	OR = 12.5 (1.9-84)

Ref: Witlox J et al. JAMA 2010;304:443-51

Delirium is expensive

Hospital costs (> \$8 billion/year)

Post-hospital costs (>\$150 billion/year)

- Rehospitalization
- Institutionalization
- Rehabilitation
- Home care
- Caregiver burden



Delirium is often unrecognized

Previous studies: 32-66% cases
unrecognized by physicians and nurses

***Pearl: We cannot manage delirium or
decrease its complications unless we
recognize it***

How do we recognize delirium?

- Many methods currently exist
- Important to distinguish between:
 - Diagnostic evaluation
(reference standard rating)
 - Delirium screening
- In the clinical setting, typically focus on delirium screening with high sensitivity

Standardized Delirium Tests

- Confusion Assessment Method (CAM)
- CAM for the Intensive Care Unit (CAM-ICU)
- 3-Minute Diagnostic Interview for CAM delirium (3D-CAM)
- Intensive Care Delirium Screening Checklist (ICDSC)
- Delirium Index (DI)
- Delirium Observation Screening Scale(DOSS)
- Delirium Rating Scale (DRS)-Revised-98
- Delirium Symptom Interview (DSI)
- Memorial Delirium Assessment Scale (MDAS)
- Neelon/Champagne Confusion Scale (NEECHAM)
- Nursing Delirium Screening Scale (NuDESC)

....and more

Confusion Assessment Method **(CAM)**

- Most widely used method worldwide
- Used in >4500 original studies to date, translated into over 17 languages
- Short CAM (4-item)—diagnostic algorithm
 - Commonly used for screening
- Long CAM (10-item):
 - Provides information on severity/subtypes
 - Diagnostic/Reference standard purposes

CONFUSION ASSESSMENT METHOD (CAM)

(1) acute onset and fluctuating course

-and-

(2) inattention

-and either-

(3) disorganized thinking

-or-

(4) altered level of consciousness

[score based on cognitive testing]

Ref: Inouye SK, et. al. Ann Intern Med. 1990, 113: 941-8

KEY CAM FEATURES

- Acute onset and fluctuating course: symptoms tend to come on abruptly and wax/wane over the course of a day
 - Pearl: History is essential (family member, caregiver)
- Inattention: inability to maintain attention on external stimuli or shift attention to new stimuli

KEY CAM FEATURES (cont)

- Disorganized thinking: symptoms reveal disorganization of thought (*disconnected or nonsensical speech, illogical thinking, unpredictable switching of subject*), or severe degrees of cognitive impairment.
 - Tests: orientation, memory, abstraction
- Altered level of consciousness:
 - Typically reduced

SAGES COGNITIVE SCREENING FOR DELIRIUM

Item Description	Cognitive Domain
Orientation to time and place	Temporal/Spatial orientation
Immediate repetition (4 words)	Registration
• Digit spans backwards (3,4-digit spans)	Sustained attention
• Days of week backwards	Sustained attention
• Months of year backwards	Sustained attention
Recall	Short-term memory

Schmitt EM et al. JAMDA 2012; 13: 818e1-10

SPECTRUM OF DELIRIUM

Ranging from:

Hypoactive delirium (lethargy, excess somnolence)
-- often missed

to:

Hyperactive delirium (agitated, hallucinating,
inappropriate)

Pearl: Hypoactive form is more common in older persons (75%) and associated with higher mortality.

COMPARATIVE FEATURES OF DELIRIUM AND DEMENTIA

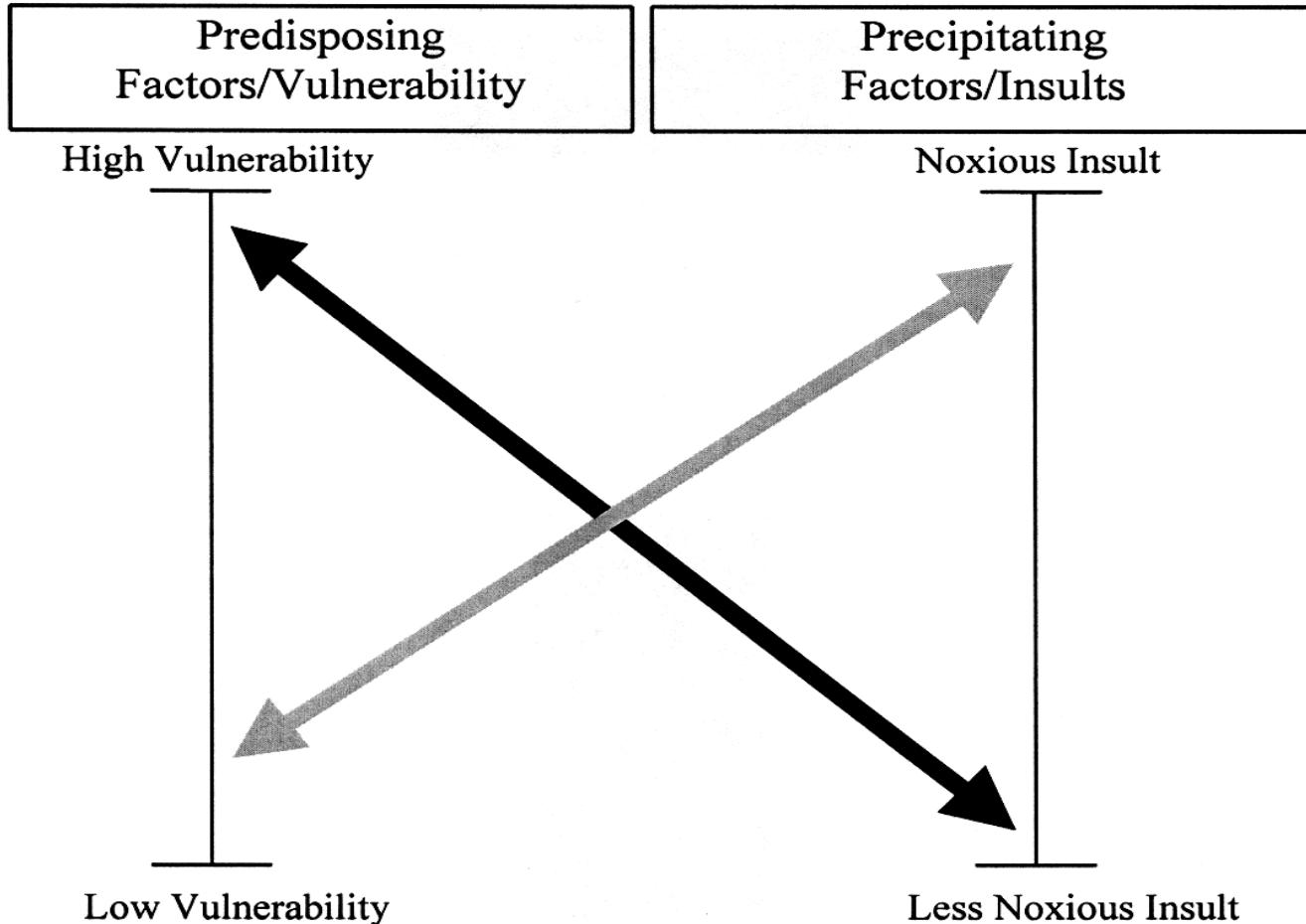
	<u>DELIRIUM</u>	<u>vs.</u>	<u>DEMENTIA</u>
Onset	Abrupt		Insidious
Duration	Hours to days		Months to years
Attention	Impaired		Normal unless severe
Consciousness	Fluctuating, reduced		Clear
Speech	Incoherent, disorganized		Ordered, anommic/aphasic

What causes delirium?

Major mechanistic hypotheses

- Neurotransmitter dysregulation
- Neuro-inflammation
- Aberrant stress response
- Oxidative stress
- Metabolic disorders
- Sleep-wake dysregulation
- Network disconnectivity
- Genetic factors

Delirium is typically multifactorial



Predisposing Factors from Predictive Models

Predisposing Factors	General Medicine	Surgery		ICU
		Non- cardiac	Cardiac	
	Relative Risks			
Dementia	2.3-4.7	2.8		
Cognitive impairment	2.1-2.8	3.5-4.2	1.3	
History of delirium		3.0		
Functional impairment	4.0	2.5-3.5		
Vision impairment	2.1-3.5	1.1-3.0		
Hearing impairment		1.3		
Comorbidity/severity of illness	1.3-5.6	4.3		1.1
Depression	3.2		1.2	
History of transient ischemia/ stroke			1.6	
Alcohol abuse	5.7	1.4-3.3		
Older age	4.0	3.3-6.6		1.1

Inouye SK et al. Lancet 2014; 383:911-922

Precipitating Factors from Predictive Models

Precipitating Factors	Medicine	Surgery		ICU
		Non-cardiac	Cardiac	
Medications				
Multiple medications added	2.9			
Psychoactive medication use	4.5			
Sedative-hypnotics				4.5
Use of physical restraints	3.2-4.4			
Use of bladder catheter	2.4			
Physiologic				
Elevated BUN/creatinine ratio	2.0-5.1	2.9		
Abnormal sodium, glucose, potassium		3.4		
Metabolic acidosis				1.4
Infection				3.1
Any iatrogenic event	1.9			
Surgery		3.5-8.3		

Inouye SK et al. Lancet 2014; 383:911-922

Who is at risk for delirium?

- Identifies who we need to be extra cautious about during hospitalization
- Allows us to proactively put into place prevention strategies
- Some targeted vulnerability factors are amenable to intervention

Medications Associated with Delirium

[2012 AGS Beers Criteria: Potentially Inappropriate Medications for Elderly]

- All tricyclic antidepressants
- Anticholinergics (eg, diphenhydramine)
- Benzodiazepines
- Corticosteroids
- H2-receptor antagonists
- Meperidine
- Sedative hypnotics
- Thioridazine/chlorpromazine

MINIMIZE PSYCHOACTIVE MEDICATIONS

Pearl: Evaluating drug usage is a high-yield intervention for delirium in the hospital

- 1) Frequently review medication list
- 2) Minimize psychoactive medications
 - Avoid PRN's
 - Use nonpharmacological approaches
 - Substitute less toxic alternatives
(e.g. antacid or Carafate for H₂ blocker/PPI
Metamucil/Kaopectate for Lomotil/Imodium)
 - Reduce dosage
- 3) Re-evaluate chronic medication usage
 - Hospital ideal time to make changes
 - Substrate is not the same

SLEEP

- One of your most important roles: help your patients get sleep at night
- Nonpharmacologic protocol: warm milk/herbal tea, relaxation music, massage
- Schedule medications, vital signs, procedures to allow uninterrupted sleep
- Lights off and decreased noise at night
- No naps during the day

Delirium is a preventable medical condition

- Previous studies documented at least 30-40% of delirium is preventable
- Multiple successful strategies:
 - Hospital Elder Life Program *(Inouye 1999, 2000; Chen 2012)*
 - Proactive geriatric consultation *(Marcantonio 2001)*
 - Exercise and rehabilitation interventions *(Caplan 2006, Schweickert 2009)*

NONPHARMACOLOGIC DELIRIUM PREVENTION: HOSPITAL ELDER LIFE PROGRAM (HELP)

Multicomponent intervention strategy targeted at 6 delirium risk factors

<u>Risk Factor</u>	<u>Intervention</u>
Cognitive Impairment.....	Reality orientation Therapeutic activities protocol
Sleep Deprivation.....	Nonpharmacological sleep protocol Sleep enhancement protocol
Immobilization.....	Early mobilization protocol Minimizing immobilizing equipment
Vision Impairment.....	Vision aids Adaptive equipment
Hearing Impairment.....	Amplifying devices Adaptive equipment and techniques
Dehydration.....	Early recognition and volume repletion

Inouye SK. N Engl J Med 1999;340:669-76.

HELP Impact on Outcomes

Reference	No. of Patients	Rate in HELP	Rate in Controls	Improvement with HELP
PREVENTION OF DELIRIUM				
Rubin 2011	>7,000	18%	41%	23%
Chen 2011	179	0%	17%	17%
Caplan 2007	37	6%	38%	32%
Rubin 2006	704	26%	41%	15%
Inouye 1999	852	10%	15%	5%
REDUCED COGNITIVE DECLINE (MMSE decline by 2+ points)				
Inouye 2000	1,507	8%	26%	18%
REDUCED FUNCTIONAL DECLINE (ADL decline by 2+ points)				
Inouye 2000	1,507	14%	33%	19%
DECREASED HOSPITAL LENGTH OF STAY				
Rubin 2011	>7,000	5.3 days	6.0 days	0.7 days
Caplan 2007	37	22.5 days	26.8 days	4.3 days
Rubin 2006	704	---	---	0.3 days
REDUCED INSTITUTIONALIZATION				
Caplan 2007	37	25%	48%	23%
DECREASED FALLS				
Inouye 2009	--	2%	4%	2%
Inouye 2009	--	3.8/1000 p-y	11.4/1000 p-y	7.6/1000 p-y
Inouye 2009	--	1.2/1000 p-y	4.7/1000 p-y	3.5/1000 p-y
Caplan 2007	37	6%	19%	13%
DECREASED SITTER USE				
Caplan 2007	37	330 hours	644 hours	314 hours

HELP Impact on Costs

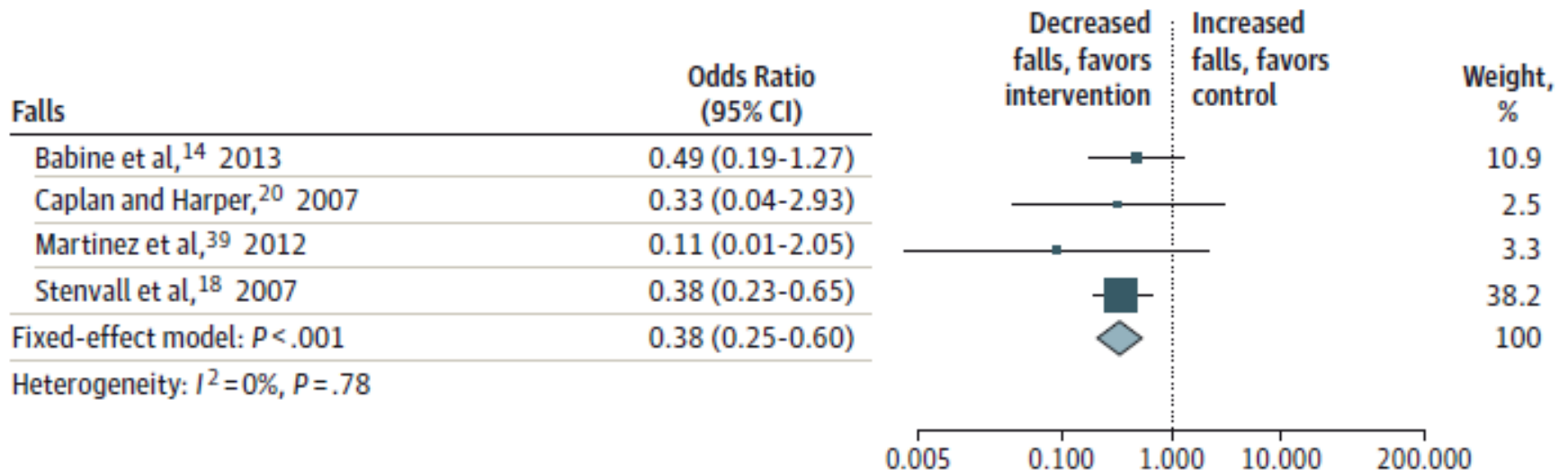
Reference	No. of Patients	Impact on Cost
Rubin 2011	>7,000	>\$7.3 million per year savings in hospital costs (> \$1000 savings per patient)
Rizzo 2001	852	\$831 cost savings per person-yrs in hospital costs
Leslie 2005	801	\$9,446 savings per person-yrs in long-term nursing home costs
Caplan 2007	111	\$121,425 per year savings in sitter costs

HELP and Fall Prevention

- Delirium/Altered mental status is the leading risk factor for falls in the hospital
- Evidence-based program that can prevent hospital falls; part of AHRQ Hospital Falls Toolkit
<http://www.ahrq.gov/professionals/systems/hospital/fallpxtoolkit/>
- At 29 hospitals with HELP, 95% of sites track fall rates and all noted a reduction in the rate of falls

Meta-analysis Results: Falls

- Meta-analysis of 14 studies with nonpharmacologic multicomponent interventions for delirium (12 HELP-based)



DELIRIUM MANAGEMENT:

NONPHARMACOLOGIC

Intervention	Results	Reference
Proactive geriatric consultation	Decreased incidence of delirium	Marcantonio 2001
Systematic detection and specialized care	Trend towards cognitive improvement	Cole 2002
Delirium Room	Reduced use of sedative drugs	Flaherty 2003
Comprehensive Geriatric Assessment	Reduced delirium severity and duration	Pitkala 2006
Delirium Abatement Program	Improved detection of delirium by nurses in post-acute setting	Marcantonio 2010

PHARMACOLOGIC APPROACHES

- 16 high quality RCTs of:
 - Haloperidol, olanzapine, risperidone
 - Melatonin
 - Rivastigmine, donepezil
 - Dexmedetomidine (OR, ICU)
- Studies hampered by methodologic limitations (nonblinded outcomes, dropouts, measurement)
 - 6 trials: no difference in delirium rates
 - 8 trials: delirium reduced; no impact on any clinical outcomes
 - 2 trials: clinical outcomes worsened (increased delirium duration or severity, increased LOS or mortality)

PHARMACOLOGIC APPROACHES

(cont)

- Drug treatment may reduce agitation but prolong delirium and cognitive decline
- Conclusion reached by several systematic review and guideline panels:

No recommendation for drug treatment for prevention or management of delirium at this time

Ref: NICE 2010, VA HSRD 2011

DELIRIUM MANAGEMENT

PHARMACOLOGIC (cont)

Pearl: Reserve for patients with severe agitation which will:

- 1. cause interruption of essential medical therapies
(e.g., intubation)***
- 2. pose safety hazard to patient or staff***

Recommended Approach:

- Haloperidol 0.25-0.50 mg po or IM (IV short acting, risk of torsades)
- Repeat dose Q 30 minutes until patient manageable (maximum haloperidol dose 3-5 mg/24 hours)
- Maintenance: 50% loading dose in divided doses over next 24 hours
- Taper dose over next few days

American Geriatrics Society Delirium Guidelines

- Focus on postoperative delirium, however, systematic review was comprehensive
 - <http://geriatricscareonline.org/toc/american-geriatrics-society-clinical-practice-guideline-for-postoperative-delirium-in-older-adults/CL018>
- Followed IOM Approach for Trustworthy Guidelines, with systematic literature review and adjudication by a 23-member expert panel

Ref: AGS Guidelines Panel. J Am Geriatr Soc. 2014; 63:142-150

AGS Clinical Practice Guideline: Strong Recommendations

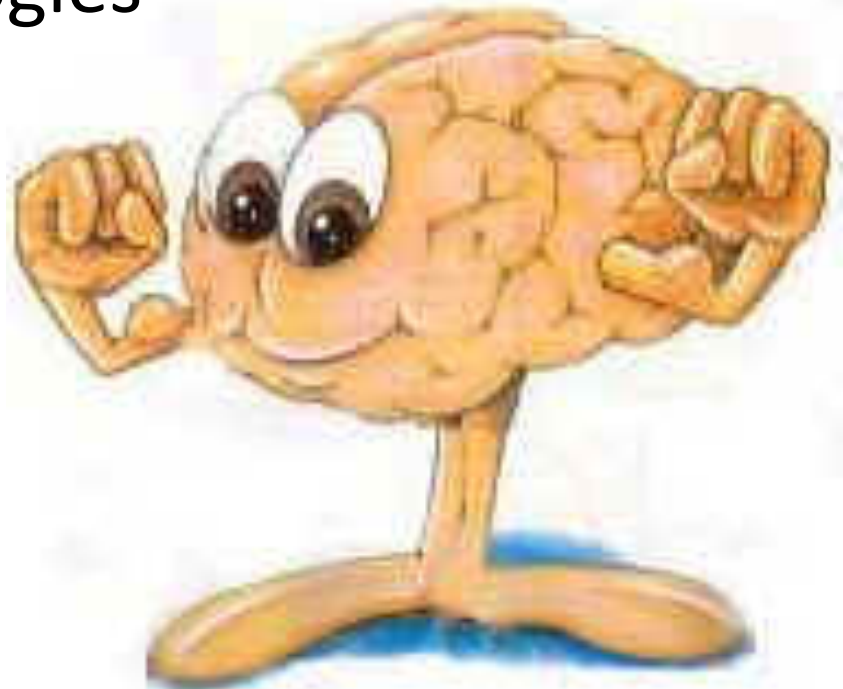
- Multicomponent nonpharmacologic interventions should be implemented to prevent delirium
- Ongoing education for all healthcare professionals
- Medical evaluation to identify underlying contributors
- Pain management (preferably with non-opioids) should be optimized to prevent postoperative delirium
- Medications with high risk for delirium should be avoided
- Benzodiazepines should not be used for first-line treatment of agitation in delirium
- Antipsychotics and benzodiazepines should be avoided in hypoactive delirium
- Cholinesterase inhibitors should not be newly prescribed for delirium prevention or treatment

Why is addressing delirium important?

- Tremendous clinical impact
- Healthcare costs and policy implications
- Indicator of quality of care for elders
- Helps us understand the brain
- Prevention of cognitive impairment and dementia

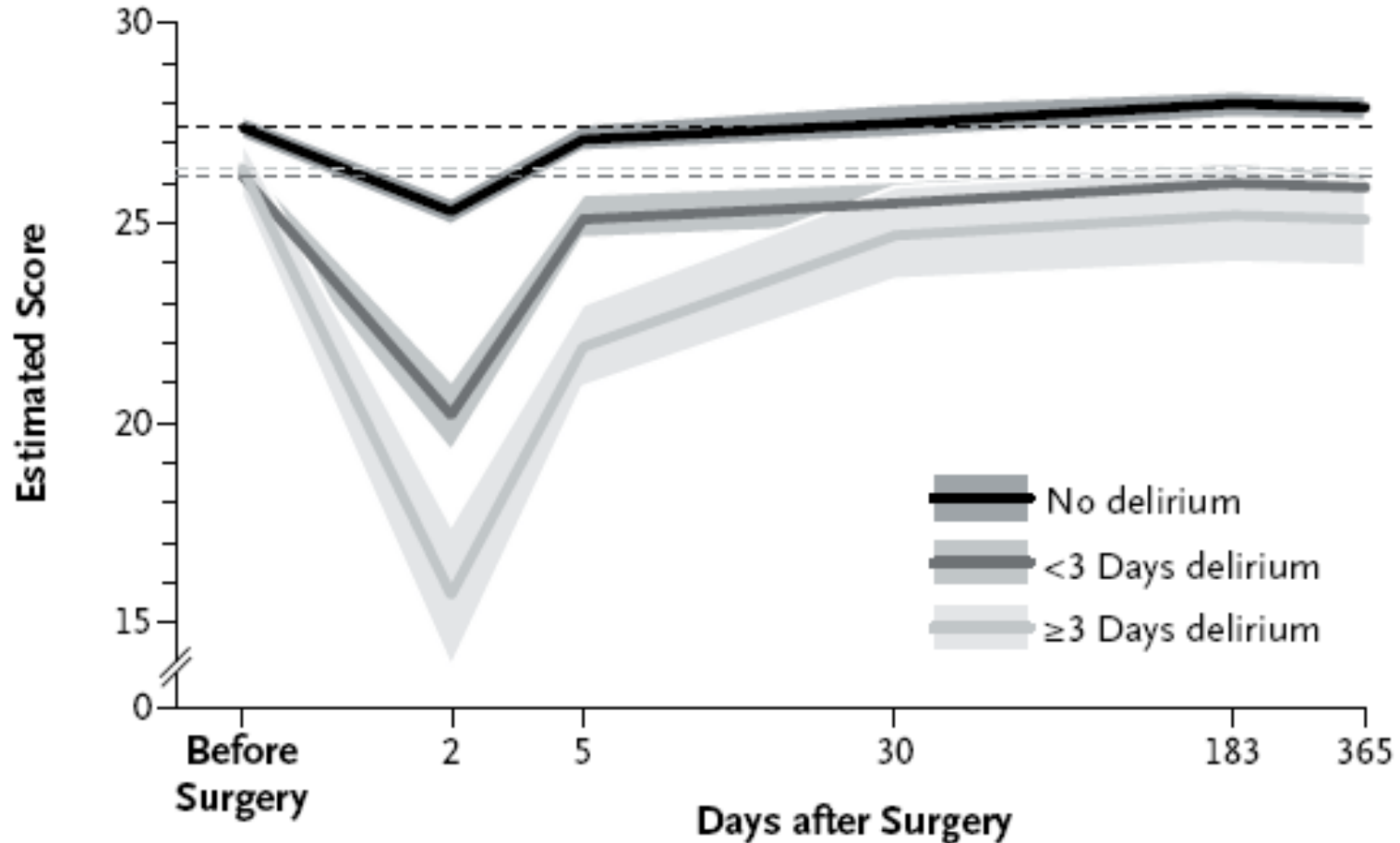
Delirium sheds light on brain function

- Delirium = “Acute Brain Failure”
- Final common pathway of many different and disparate etiologies
- Understanding how the brain fails will shed light on many brain disorders



Short-Term Impact of Delirium

(N=225 cardiac surgery patients)



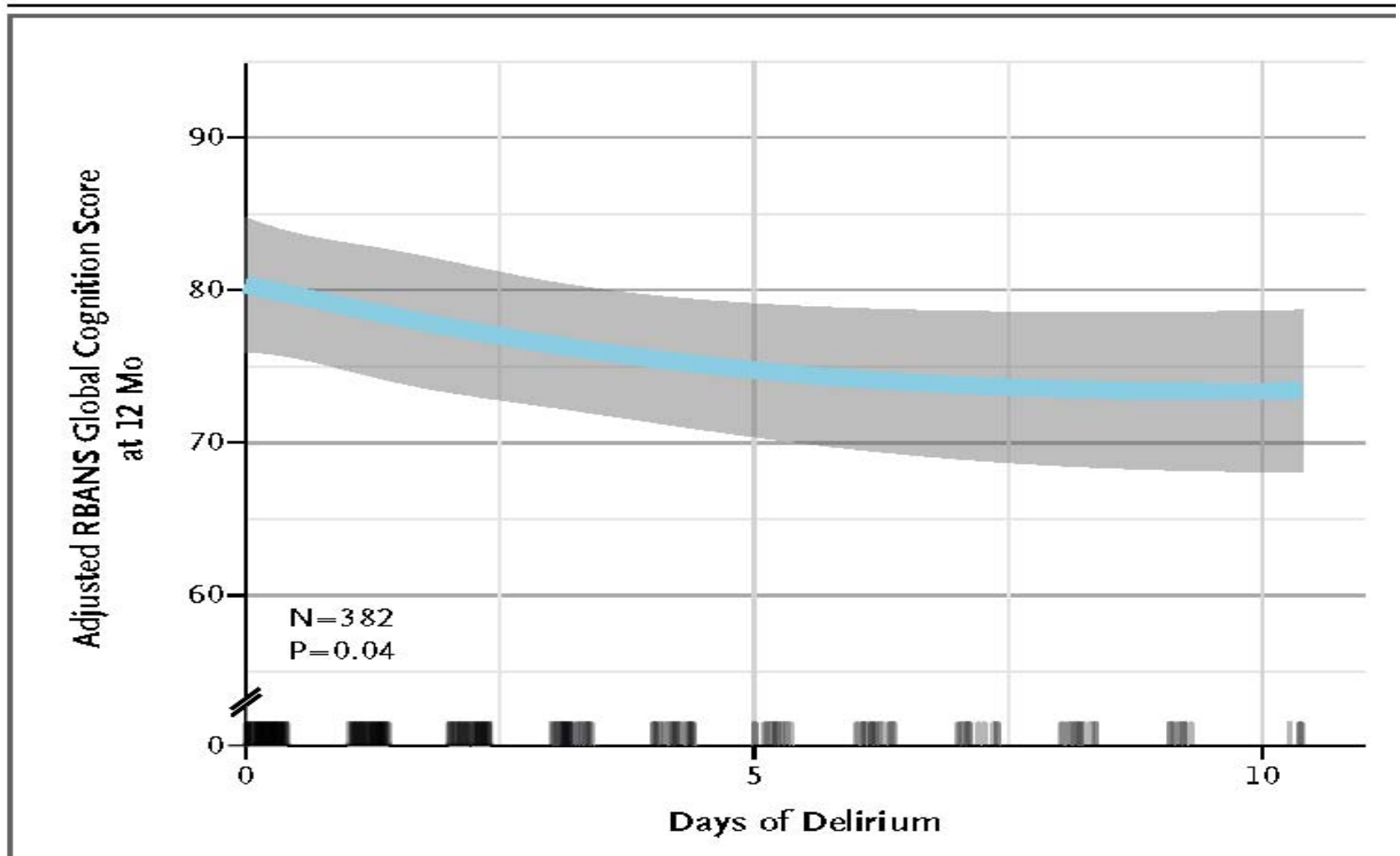
Saczynski JS et al. N Engl J Med. 2012; 367:30-9

Impact of Delirium (cont)

- Delirium occurred in 46% patients following cardiac surgery
- Cognitive trajectory characterized by abrupt initial decline followed by gradual recovery over 6 months
- Delirious patients (>3 days) did not get fully back to baseline even at one year follow-up
- Implications for rehab and management of delirium; importance of prevention of delirium.

BRAIN-USA: Impact of Delirium after ICU stay

[N=821 ICU survivors]



Pandharipande PP et. al, NEJM 2013;369:1306-16

Impact of Delirium post-ICU

- 74% developed delirium during ICU stay
- Longer duration of delirium associated with worse global cognition at 3 and 12 months follow-up
- Longer duration of delirium associated with worse executive function at 3 and 12 months follow-up
- >30% with deficits at 12 months
- No true baseline measures of cognition

***Preventing delirium may offer the
unprecedented opportunity to
prevent or ameliorate future
cognitive decline.***

BACK TO THE BEDSIDE:

Pearls for Practice

1. *Assess for delirium* in all older hospitalized patients: cognitive screening and CAM. Find out baseline.
2. *Evaluate medications* and reduce psychoactive drugs.
3. *Use nonpharmacologic approaches* to manage sleep, anxiety, and agitation.
4. *Reserve pharmacologic approaches* for patients with severe agitation or psychosis.
5. *Involve family members* for reorientation.
6. *Avoid bedrest orders*; encourage mobility.
7. Make sure patients have their *glasses, hearing aids, and dentures*.
8. *Communicate*: Keep patients/families involved.