

Clearing Up the Confusion about Confusion

**Prevalence, Diagnosis, and Treatment of
Cognitive Dysfunction in Older Patients**

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Introduction

- ◆ **Learning Goals and Overview:**
 - Know the definitions of delirium and dementia
 - Appreciate their respective prevalence
 - Understand common causes of delirium
 - Develop facility in and differentiating delirium from dementia
 - Learn strategies for recognizing dementia
 - Acquire basic understanding of current therapies

Clinical Case

- ◆ **Mr. Kensington: 79 year old male s/p ORIF for hip fracture POD #2**
- ◆ **During hospitalization, has become less communicative, now resisting dressing changes.**
- ◆ **Current Medications**
 - HCTZ 25mg QD
 - Coumadin 5mg (started post-op)
 - Atenolol 50 mg QD
 - Percocet Q6 hrs prn
- ◆ **PMH**
 - Hypertension, BPH

Clinical Case #1 Background

- ◆ **SH: retired lawyer, widowed for 3 years, lives alone, no tobacco, occasional alcohol**
- ◆ **No history of functional dependencies**
- ◆ **No previous cognitive testing**
- ◆ **Is this patient delirious? Demented?**

DSM-IV Delirium Definition

- ◆ Disturbance of consciousness
- ◆ Cognitive change not accounted for by preexisting dementia
- ◆ Develops over short time period
- ◆ Symptoms fluctuate over the day

American Psychiatric Association: *Diagnostic and Statistical Manual of Mental disorders*, 4th edition. Washington, DC, APA 1994.

DSM-IV Dementia Diagnosis

- ◆ An acquired impairment in multiple areas of intellectual function: memory + (language, praxis, object recognition, or executive function)
- ◆ That interferes with either occupational or social functioning or interpersonal relationships and represent a decline
- ◆ And is not secondary to delirium

Why Focus on Learning About Delirium or Dementia?

- ◆ Delirium - perhaps the most frequent complication in elderly hospitalized patients
- ◆ Prevalence: 14% - 24% at time of admission
- ◆ Post-op delirium occurs in 10% to 52%
- ◆ For 80% some symptoms persist > 6 months
- ◆ Two-year survival: 33%

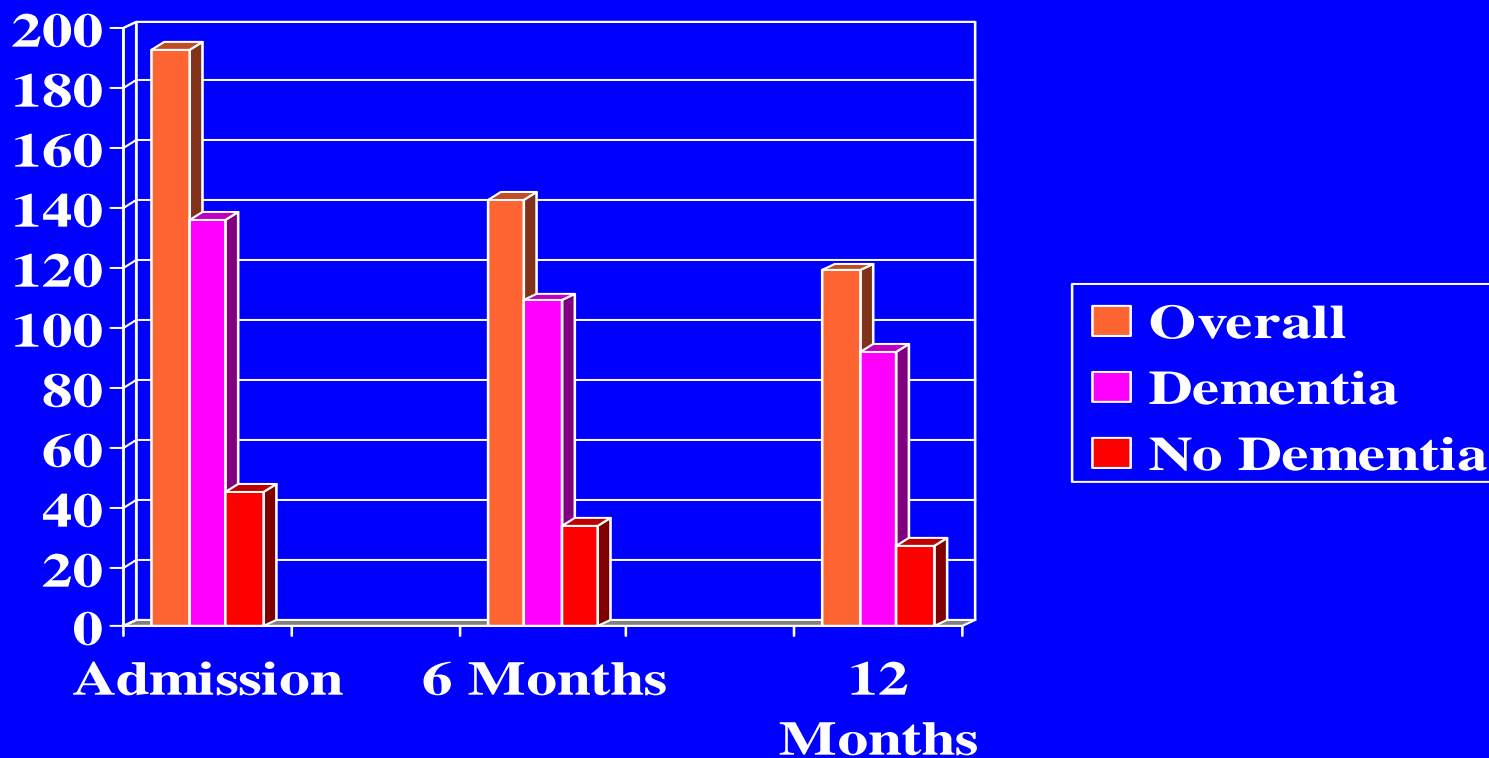
Relationship Between Delirium and Dementia

- ◆ Dementia strongest risk factor: 25-75% of patients with delirium have dementia (5-fold risk increase)
- ◆ Cohort of 193 older patients diagnosed with delirium at admission or 1st week of hospitalization

Delirium Type	Overall (N=193)	Dementia (N=136)	No Dementia (N=45)
Prevalent	165 (85.5)	123 (90.4)	33 (73.3)
Incident	28 (14.5)	13 (9.6)	12 (26.7)

McCusker J. J Gen Intern Med. 2003;18:696-704

Persistence of Symptoms



12-month deaths: 57 (29.5%)

McCusker J. J Gen intern med. 2003;18:696-704

Therapeutic Nihilism?

- ◆ **Both conditions are “treatable”**
 - Relief of symptoms
 - Removal of exacerbating causes
 - Reduction in associated “complications”
- ◆ **Missing the diagnosis for either may mean missing a life-threatening condition**
- ◆ **Dementia – one of the more common causes of disability and “family suffering” amongst a myriad of age-associated illnesses**
 - Treatment of family/caregivers

More on Debunking Nihilism: Why Diagnose Dementia?

- ◆ Previously unrecognized but treatable comorbidity
- ◆ Patient safety issues
- ◆ Appropriate planning
- ◆ Caregiver issues
- ◆ Benefits of therapy for AD
- ◆ Benefits of therapy for vascular causes

Dementia Prevalence

Prevalence is age dependent

Age range	affected %*
◆ 65 – 74 years	5 %
◆ 75 – 84 years	15 – 25 %
◆ 85 and older	35 – 50 %

***US population**

Causes of Dementia

- ◆ Alzheimer's disease – (55-70%)
- ◆ Vascular dementia – (10%)
- ◆ Frontotemporal dementia – (5%)
- ◆ Dementia with Lewy bodies – (15%)
- ◆ Toxic-metabolic disorders – (4%)
- ◆ Other Movement Disorders – (6%)
- ◆ Depression*

*Dementia symptoms

Delirium Risks and Aging

- ◆ Like other geriatric syndromes, multifactorial
- ◆ Combination of vulnerability (e.g., dementia) and noxious insult or precipitant
- ◆ The greater the vulnerability, the more benign a precipitant can be
- ◆ Delirium may be the only presenting symptom of a life-threatening disorder.

Predisposing Factors

- ◆ **Multiple medications (especially psychoactive)**
- ◆ **Baseline cognitive impairment (brain disease)**
- ◆ **Severe underlying illness and comorbidity**
- ◆ **Functional impairment**

Predisposing Factors (2)

- ◆ **Chronic renal insufficiency**
- ◆ **Dehydration**
- ◆ **Malnutrition**
- ◆ **Sensory impairment**
- ◆ **Immobility (including restraint use)**
- ◆ **Bladder catheters**

Recognition of Delirium – 2 Studies

- ◆ **Hospitalized patients > 70 yrs (n=797)**
 - Delirium present in 239 of 2721 assessments (9%)
 - Nurses recognized only 46 of these (19.3)% (using paired researchers as gold standard)
- ◆ **Urban academic ED – 12 months (297/337 eligible)**
 - 30 (10%) w/delirium
 - 11 (37%) discharged home

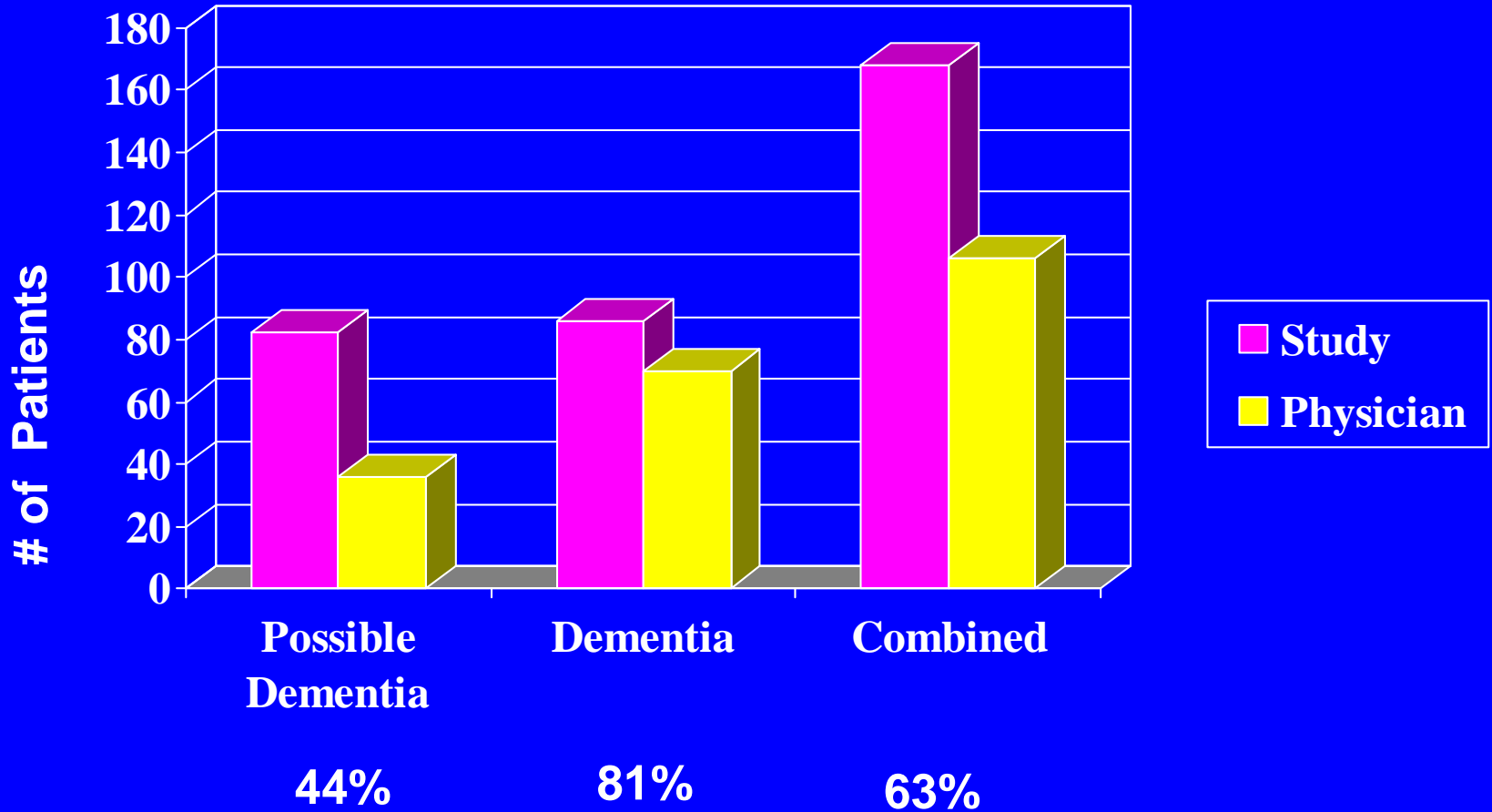
Inouye S. Archives Int Med. 2001;161:2467-73.

Hustey F. Ann Emerg Med. 2002;39:248-53.

Recognition of Dementia

- ◆ **Surveyed physicians in California health maintenance organization (2000-01)**
- ◆ **Asked physicians to estimate the cognitive functioning of one of selected patients participating in a cohort study using a 2-stage dementia assessment (TICS/TDQ)**

Recognition of Dementia



Clinical Case: Exam

- ◆ BP147/79; HR 82 and regular; RR 16; RA O₂ sat 96%
- ◆ Denies any pain, no complaints
- ◆ The remainder of physical exam is normal except that RLE in sling, bandages intact and Foley in place
- ◆ Labs normal except for UA: (sent earlier in day because of cloudy appearance) 50 - 100 WBS with clumps, few RBCs

Diagnostic Strategies

- ◆ **Establish baseline if possible**
 - How was this person functioning before hospitalization?
- ◆ **Confusion Assessment Method**

Confusion Assessment Method

- ◆ 1) Acute onset and fluctuating course
 - AND
- ◆ 2) Inattention
 - AND EITHER
- ◆ 3) Disorganized thinking
 - OR
- ◆ 4) Altered level of consciousness
 - 95% sensitivity and specificity

CAM Applied

- ◆ Patient had normal cooperative behavior through noon that day, intermittent difficulty since
- ◆ Some tangential, illogical answers to questions
- ◆ Failed A-test

Tests for Inattention

◆ The “A” Test

- Read a list of letters (up to 60) with the letter “A” occurring more frequently and in the same tone. Ask the patient to indicate every time they hear an “A”.
- Count errors of omission and commission
- > 2 errors considered abnormal

Mr. K. Has a Delirium

◆ Treatment....

Next Steps

- ◆ **Precipitants:**
 - UTI
 - Immobilization
 - Narcotics
- ◆ **Therapies:**
 - Send urine culture
 - DC Foley
 - Start antibiotics
 - Hold Percocet
 - Arrange for sitter

Is There an Underlying Dementia?

- ◆ Establish baseline: (SH, pre-hospitalization functional status from family-informants)
- ◆ Operationalize DSM-IV

Useful Information

- ◆ **Daughter lives in another state but has noticed the following over the past year :**
 - **Forgetting previous conversations**
 - **Friends stopped playing bridge with patient**
 - **Serious errors in balancing checkbook (IADL)**
 - **Recent daytime sleeping with more sleep disruption at night**

“Sun-downing”

- ◆ Poorly understood phenomenon of behavioral deterioration in the evening hours
- ◆ Most typical in demented and or institutionalized patients
- ◆ Presume delirium if a new pattern
- ◆ Otherwise (if pattern is established and no obvious medical precipitant) it's due to impaired circadian regulation or environmental factors

Sun-downing Treatment

- ◆ Sleep hygiene
- ◆ Remove precipitants
- ◆ Trazodone 50 mg QHS

Treatments: Prevention First

- ◆ **Identify those at risk**
 - History of dementia or other brain disorders (< 20 on MMSE)
 - Other conditions associated with increased risk
- ◆ **Avoid**
 - Restraints (use sitters instead)
 - Foley catheters
 - Immobilization
- ◆ **Prevent dehydration (BUN / Creatinine >17)**
- ◆ **Provide**
 - Visual aids, hearing assists
 - Frequent reorientation (sitters / family members)

A Successful Intervention to Prevent Delirium

- ◆ Orientation board - communication to reorient to surroundings
- ◆ Relaxation music, nighttime noise reduction, warm drink, back massage
- ◆ Ambulation or active ROM exercises
- ◆ Visual aides, adaptive equipment
- ◆ Amplification device, earwax removal
- ◆ Volume repletion when BUN/Cr >18

Inouye SK, Bogardus ST, Charpentier PA, et al. JEJM 1999;340:669-676.

Remove or Adjust Potential Causative Medication

- ◆ Anticholinergics (Benedryl, Amitriptyline)
- ◆ Sedatives/Hypnotics (Benzodiazepines)
- ◆ Analgesics (Narcotics, NSAIDs)
- ◆ H-2 receptor blockers (Zantac, Tagamet)
- ◆ Digoxin
- ◆ Antiepileptics
- ◆ Corticosteroids
- ◆ Attend to medication interactions /
Volume of distribution

Identify and Treat Causative Medical Problems

- ◆ **Correct hydration, hyper/hyponatremia**
- ◆ **Treat infections (UTI, Pneumonia, Skin, Soft tissue)**
- ◆ **Address metabolic derangements: hyper/hypoglycemia, uremia, liver failure**
- ◆ **Treat low perfusion states (shock, CHF)**
- ◆ **Detect and treat withdrawal (alcohol, sedatives – especially benzodiazepines)**

“Dangerous” Agitation

Preferred medical therapy

◆ Oral

- Risperidone (start at 0.25mg PO – also as an elixir)

◆ Parenteral

- Haldol (start at 0.25mg IM, IV)

◆ Maximum dose 2mg / day for either

◆ Sleep promotion

- Trazodone (start at 50mg PO QHS)

Components of the Mini-mental State Examination (MMSE)

- ◆ Orientation
- ◆ Registration
- ◆ Attention & Calculation
- ◆ Short-term recall
- ◆ Language
- ◆ Construction

Limitations of MMSE

- ◆ **Education and age-related bias**
- ◆ **Heavily weighted on language**
- ◆ **Misses frontal lobe dementias**
- ◆ **Floor and ceiling effects**

Memory Impairment Screen (MIS)

- ◆ **3 Minutes**
- ◆ **4 Items**
- ◆ **Delayed and cued free recall test**
- ◆ **8 Points**

Memory Impairment Screen ₂

- ◆ “Sport: Swimming”
- ◆ 4 categories and items
- ◆ Recall the items after “interference”

Memory Impairment Screen ₃

- ◆ **Score: 0 – 8**
- ◆ **Cutpoint of 4: (community-based volunteers)**
 - Sensitivity 0.80
 - Specificity 0.96
- ◆ **At base rate of 5% to 20% the negative predictive value is 0.99 to 0.95**

6-Item Screener

- ◆ **3-item recall**
 - apple
 - table
 - penny
- ◆ **3-item temporal orientation**
 - day of week
 - month
 - year
- ◆ **Takes 1-2 minutes**
- ◆ **Comparable to MMSE or Blessed Dementia Rating Scale (≥ 3 errors: sensitivity 88.7; specificity 88.0)**

6-Item Screener ₂

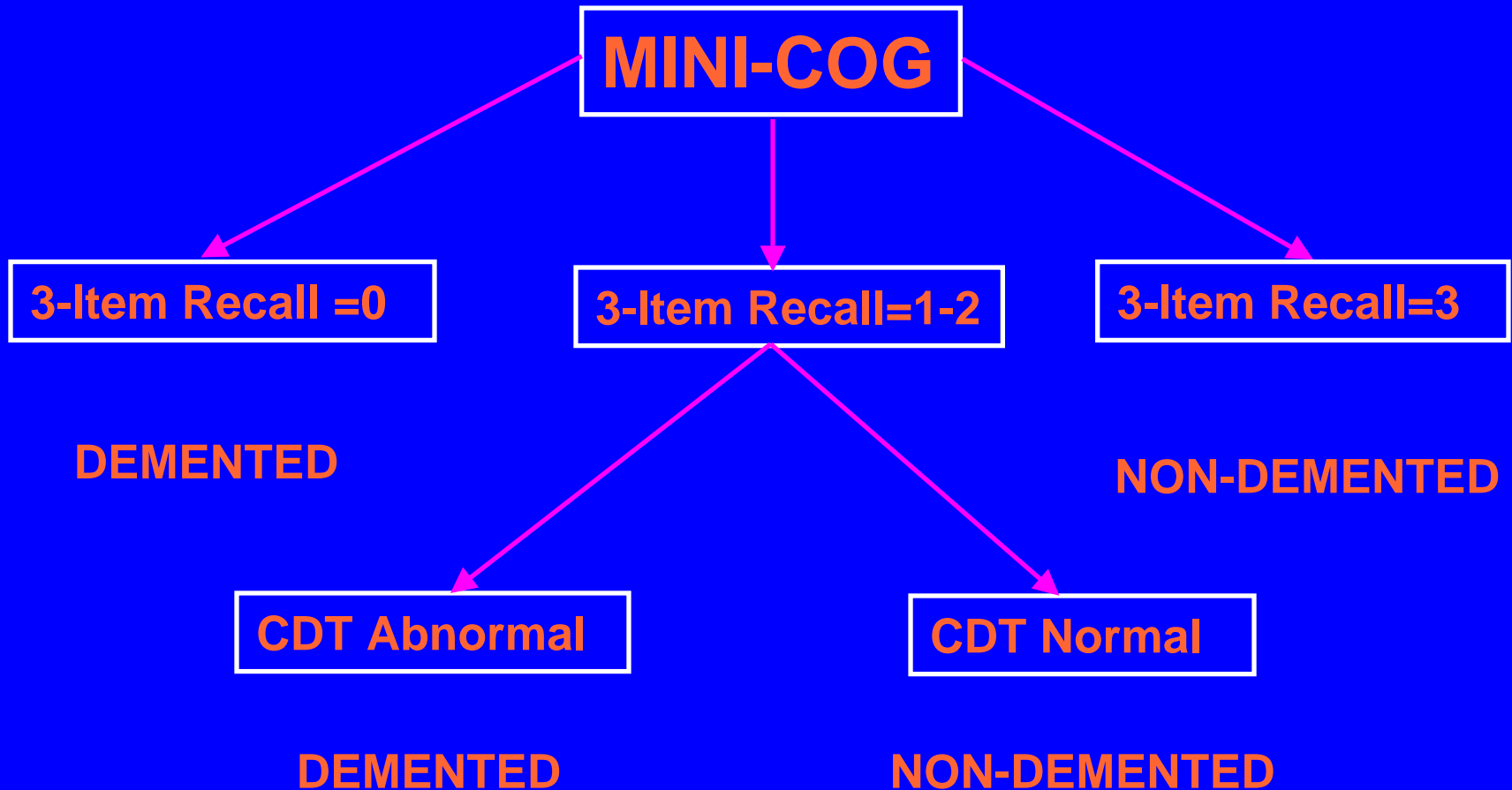
Area Under ROC Curve for MMSE Compared to Six-Item Screener

	Gold Standard	Six-item screener	MMSE
Community Sample			
	Cognitive impairment	0.86	0.84
	Dementia	0.95	0.96
Clinical Sample			
	Cognitive Impairment	0.91	0.93
	Dementia	0.92	0.95

MINI-COG

- ◆ **Three-item recall**
 - ✓ **Assure registration (Maximum 3 trials)**
- ◆ **Clock drawing test**
 - ✓ **Large circle, insert all numbers, “ten minutes past eleven”**

MINI-COG₂



MINI-COG Scoring

- ◆ One point for each item recalled (0-3)
 - ◆ Normal clock = 2 points; abnormal = 0
 - ◆ Normal clock must have:
 - ✓ All 12 numbers (relatively) evenly spaced inside circle
 - ✓ Two hands pointing to 11 and 2
 - ◆ MINI-COG score:
 - ✓ 0-2 suggests dementia
 - ✓ 3-5 suggests no dementia
 - ◆ MINI-COG* outperforms MMSE and CASI
- *Borson et al, Int J. Geriatr Psychiatry. 2000;15:1021-1027

MINI-COG₃

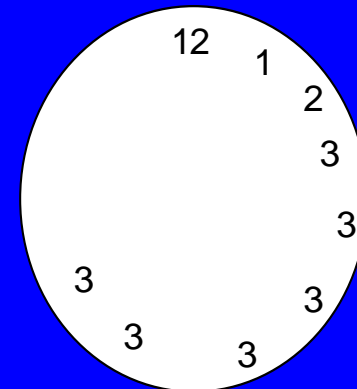
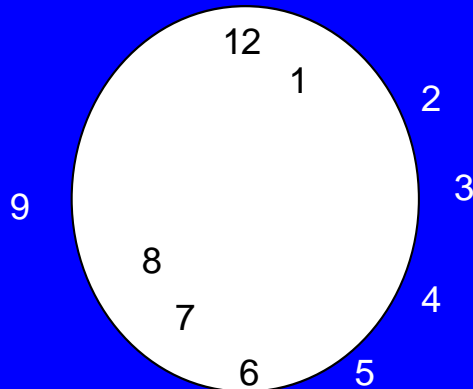
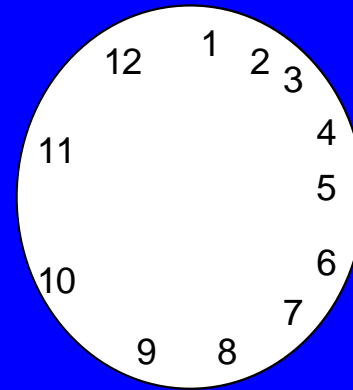
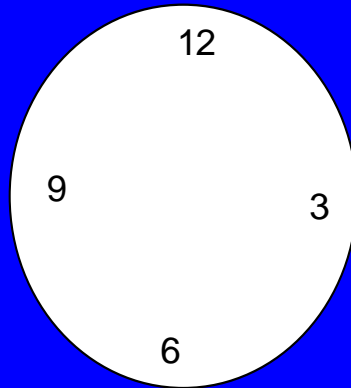
Comparison of Cognitive Tests

	Sensitivity	Specificity
Mini-Cog	99	93
3-Item Recall	91	97
CDT	79	92
CASI	92	96
MMSE	91	92

A Useful Addition: The Clock Drawing Test

- ◆ **Less dependence on education and language**
- ◆ **Identifies deficits in:**
 - ✓ **Visual-spatial**
 - ✓ **Construction (planning)**
 - ✓ **Abstraction**
 - ✓ **Focal deficits**
- ◆ **Dependent upon fine motor skills and intact vision**
- ◆ **More qualitative— requiring some judgment**

Clock Examples



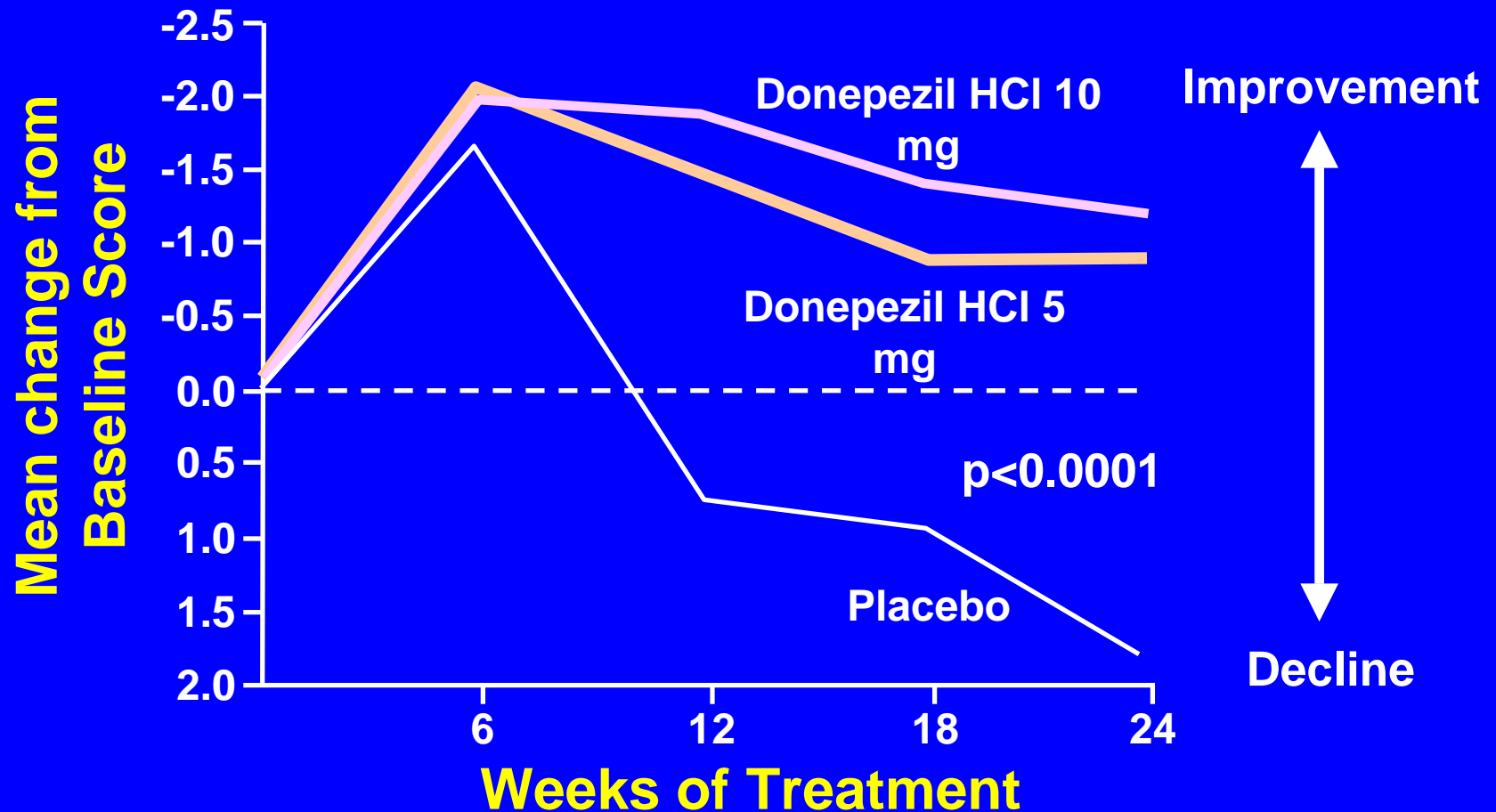
Administering Any Mental Status Exam

- ◆ **Normalize the examination: “Something I do with all of my patients....”**
- ◆ **Explain why: “To get a better sense of whether there are any difficulties that we can help with....”**
- ◆ **Provide reasonable expectations (avoid insult and/or embarrassment): “Some of these questions will be very easy, others will be more difficult....”**

Dementia Therapy

- ◆ Behavioral management
- ◆ Caregiver support
- ◆ Community resource utilization
- ◆ Advance care planning
- ◆ Safety (driving/adult protective)
- ◆ Medications

Donepezil HCl (Aricept) ADAS-Cog*



*In 1 controlled clinical trial of 30 weeks duration in 473 patients, 154 patients were randomly assigned to receive daily doses of 5 mg. 157 patients were randomly assigned to receive daily doses of 10 mg. 162 pts. were randomized to placebo. The 30-week trial was divided into a 24-week double-blind active treatment phase followed by a 6-week single-blind placebo washout period; Rogers et al. Neurology. 1998;50:136-145

Pharmacologic Agents to Reduce Deterioration

Characteristic	Donepezil	Rivastigmine	Galantamine	Memantine
Serum conc. time	3 – 5 hr	0.5 – 2 hr	0.5 – 1 hr	3 – 7 hr
Absorption-food	No	Yes	Yes	No
½ Life	70 – 80 hr	2 hr	5 – 7 hr	60 – 80 hr
Dose: Start / Max	5mg QD / 10 mg QD	1.5 mg BID / 6 mg BID	4mg BID / 12 mg BID	5mg QD / 10 mg BID
Action	Cholinest. Inhibitor	Cholinest. Inhibitor	Cholinest. Inhibitor	NMDA- receptor antagonist

Cummings J. NEJM. 2004;351:56-67.

Adverse Effects

	Nausea	Vomiting	Diarrhea
Donepezil	17%	20	17
Rivastigmine	48%	27	19
Galantimine	37%	21	12

- ◆ **Weight loss, insomnia, muscle cramps, bradycardia, syncope, fatigue**
- ◆ **Starting at low doses with slow titration reduces sxS**
- ◆ **No identified adverse effects for Memantine in clinical trials**

Duration of Therapy

- ◆ **Uncertain...**
- ◆ **Trials up to a year have shown a difference in cognition and function**
- ◆ **Extrapolated data from rate of deterioration in placebo group c/w treatment suggest 2 to 3 years for continued benefit**

Other Potential Therapies

- ◆ **Vitamin E may does not delay cognitive decline (2000 IU daily)**
 - one RCT of 769 patients with MCI (E, Donepezil 10 mg, placebo for 3 years) 16% / yr progression to AD¹
 - Caution: long term effects may cause CHF
- ◆ **Recent review, including 2 meta-analyses, found pharmacological therapies not very effective for management of neuropsychiatric symptoms (increased stroke risk)**
- ◆ **Atypical antipsychotics not more effective²**
- ◆ **Cholinesterase inhibitors may be better**

¹ N Engl J Med 2005;352:2379-88.

² N Engl J Med 2006;355:1525-38

Conclusion

- ◆ **Delirium and dementia are highly prevalent conditions with devastating consequences, even more so when not addressed**
- ◆ **Clinicians can identify and diagnose many “at the bedside”**
- ◆ **Interventions can be highly beneficial**

Appendix

Components of the Mini-mental State Examination (MMSE)

- ◆ Orientation
- ◆ Registration
- ◆ Attention & Calculation
- ◆ Short-term recall
- ◆ Language
- ◆ Construction

There are excellent palm-based versions!

Components of the MMSE

- ◆ **Orientation (10 points)**
 - What is the (year)(season)(date)(day)(month)?
 - Where are we (state)(county)(town)(hospital)(floor)?
- ◆ **Registration (3 points)**
 - Name three objects: one second to say each. Then ask the patient all three after you have said them. Give one point for each correct answer. Repeat them until all three are learned. Number of trials: _____.

Components of the MMSE₍₂₎

- ◆ **Attention and Calculation (5 points)**
 - Begin with 100 and count backward by 7 (stop after five answers). (“100, 93, 86, 79, 72, 65.”) Give one point for each correct number. Alternatively, spell "world" backward.
- ◆ **Recall (3 points)**
 - Ask for the three objects repeated above.

Components of the MMSE₍₃₎

◆ Language

- Show a pencil and a watch and ask the patient to name them. (2 points)
- Repeat the following: "No ifs, ands, or buts." (1 point)
- A three-stage command: "Take a paper in your right hand, fold it in half, and put it on the floor." (3 points)

Components of the MMSE (4)

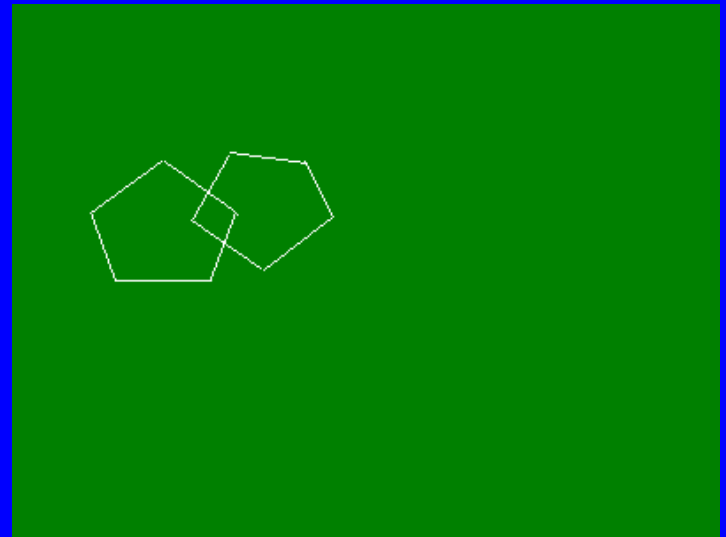
◆ Language (cont.)

- Read and obey the following: (show written item) (1 point)
 - ◆ CLOSE YOUR EYES
- Ask patient to write a sentence here: (1 point)

Components of the MMSE (5)

- ◆ **Construction (1 point)**
 - Copy a design (complex polygon).

- ◆ **Total Points: 30**



MMSE Age and Education Based Norms

Age	Education				Total
	0 – 4 yrs	5 – 8 yrs	9 – 12 yrs	≥ 12 yrs	
55 – 59	22	27	28	29	29
60 – 64	22	27	28	29	28
65 – 69	22	27	28	29	28
70 – 74	21	26	28	29	27
75 – 79	21	26	27	28	26
80 – 84	19	25	26	28	25
≥ 85	20	24	26	28	25
Total	22	26	29	29	29

Functional Activities Questionnaire (FAQ)

1. Writing checks, paying bills, balancing checkbook.
2. Assembling tax records, business affairs or papers.
3. Shopping alone for clothes, household necessities, or groceries.
4. Playing a game of skill, working on a hobby.
5. Heating water, making a cup of coffee, turning off stove.
6. Preparing a balanced meal.
7. Keeping track of current events.
8. Paying attention to, understanding, discussing TV, book, magazine.
9. Remembering appointments, family occasions, holidays, medications.
10. Traveling out of neighborhood, driving, arranging to take buses.

Functional Activities Questionnaire Scoring

- ◆ Dependent = 3
- ◆ Requires assistance = 2
- ◆ Has difficulty but does by self = 1
- ◆ Normal = 0
- ◆ Never did but could do now = 0
- ◆ Never did, would have difficulty now = 1

**Score: 0 – 30; Cutpoint of 9
recommended**

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