

Delirium: Problemi diagnostici

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Delirium.

- **Sindrome mentale organica acuta transitoria con:**
 - **Compromissione globale delle funzioni cognitive**
 - **Ridotto livello di coscienza**
 - **Anormalità nell'indirizzare, mantenere, cambiare obiettivi per l'attenzione**
 - **Attività psicomotoria aumentata o ridotta**
 - **Alterazioni del ciclo sonno - veglia**

Sinonimi (?):
stato confusionale acuto
sindrome organica cerebrale acuta
reazione organica acuta
encefalopatia metabolica
psicosi tossica esogena
stato crepuscolare

Clinical review

ABC of psychological medicine
Delirium

T M Brown, M F Boyle

BMJ 2002;325:644-7

Delirium is a common cause of disturbed behaviour in medically ill people and is often undetected and poorly managed.

It is a condition at the interface of medicine and psychiatry that is all too often owned by neither.



Sensory misperceptions, including hallucinations and illusions, are common in delirium. (*Don Quixote and the Windmill* by Gustave Doré, 1832-1883)

Objectives

- Recognize that delirium is a common presentation of disease in the elderly
- Recognize that delirium is associated with adverse outcomes
- Know how to distinguish between delirium and other diagnoses (dementia, depression)
- Identify risk factors for delirium and strategies for risk reduction
- Discuss management strategies, recognizing the limitations of current data




From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Caratteristiche cliniche

- Sviluppo in ore o pochi giorni (mancato riconoscimento!)
- Fluttuazione dei sintomi con aggravamento la sera (discrepanze nei rapporti clinici!)
- Compromissione di:
 - Coscienza
 - Vigilanza
 - Memoria
 - Attenzione
 - Capacità di programmazione

- Disorientamento
- Incoerenza del pensiero e del linguaggio
- Allucinazioni ed illusioni (visive, auditive, altro)
- Ideazione delirante correlata al disorientamento
- Aggressività
- Apatia
- Ansia, panico
- Agitazione, vagabondaggio
- Insonnia, letargia

Riconoscimento

- ! 32-67 % dei casi è non diagnosticato
- !  rischio di morbidità e mortalità
 - mancato riconoscimento della causa organica
 - mancata correzione del disturbo comportamentale
 - Immobilità  polmonite
 - Vagabondaggio  cadute e fratture

Presentation of Myocardial Infarction in the Elderly

<u>AGE</u>	<u>#</u>	<u>CP</u>	<u>SOB</u>	<u>Delirium sympt.s</u>
>65	387	19%	20%	33%
74	87	59%	22%	16%
76	777	66%	42%	30%
>62	110	22%	35%	18%

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Pathy 1967

Tinker 1981

Bayer 1986

Aronow 1987

CP: chest pain
SOB: shortness of breath
Neuro: delirium

Atypical disease Presentations

	<u>“Well Elderly”</u>	<u>“Frail elderly”</u>
% with atypical presentation	25%	59%
Type of Presentation		
Delirium	32%	61%
Falls	37%	9%
Immobility	5%	6%
Functional decline	26%	19%
Other	0	5%

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Jarrett et al. Arch Int Med 1995

Patients were classified as being well or frail on the basis of the premorbid Barthel Index (well, score of > or = 95 [n = 76]; frail, score of < 95 [n = 117])

Criteri diagnostici standardizzati. 1

- **DSM III 1980**

- identificazione del quadro
- sindrome psichica organica
- causata da alterazioni somatiche
- con sintomi psichiatrici multipli

- permette la ricerca e la comunicazione tra clinici
- riassume le sindromi:
 - stato confusionale acuto
 - confusione postoperatoria
 - psicosi da Unità di Terapia Intensiva

Criteri diagnostici standardizzati. 2

- **DSM IV 1994**

- Disturbo della **coscienza** con riduzione dell'attenzione
- Disturbo **cognitivo** (memoria, pensiero, orientamento, linguaggio) o **percettivo**, senza precedente anamnesi di demenza
- Comparsa **acuta e fluttuazioni** nell'arco della giornata

- **Evidenze dalla storia, dall'esame fisico, dal laboratorio di:**

- effetti di una patologia organica sistemica
- e/o fattori tossici
- e/o effetti di farmaci
- e/o possibili cause multiple

Prevalence and Incidence in Hospitalized patients



Prevalence and Incidence in Hospitalized patients

- **Schor 1992** **Medical & surgical >65** **N=325**
 - 11% prevalence, 31% incidence
- **Johnson 1990** **Medical >70** **N=235**
 - 16% prevalence, 5% incidence
- **Francis 1990** **Medical >70** **N=229**
 - 16% prevalence, 8% incidence
- **Gufstafson 1988** **Femoral neck Fract >65** **N=111**
 - 33% prevalence before surgery,
 - 42% incidence after surgery

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Epidemiology

- 14-24% prevalence at time of hospital admission
- 6-56% incidence (new cases) during admission
- 63% of patients had no signs of delirium at 3 month follow-up
- 68% of patients had no signs of delirium at 6 month follow-up

Prevalence of delirium

Setting	% with delirium
Hospitalised medically ill patients*	10-30%
Hospitalised elderly patients	10-40%
Hospitalised cancer patients	25%
Hospitalised AIDS patients	30-40%
Terminally ill patients	80%

*High risk conditions and procedures include cardiomy, hip surgery, transplant surgery, burns, renal dialysis, and lesions of the central nervous system

**Da: Gail Greendale,
MD, Brandon
Koretz, MD,
Lecture, UCLA.**

Delirium. Incidenza delle 4 forme cliniche.

- **5-56% dei pazienti ultrasessantacinquenni ospedalizzati presenta Delirium**
 - (5%: Johnson, 1990; 15%: Rudberg 1977; 25% Francis, 1992; Schor 1992; Inouye 1993; O’Keeffe 1997; Milisen 1999; 51% Williams, 1985)
- **Forma “iperattiva” (22%)**
 - P. vigile, iperattivo, rispondente agli stimoli
- **Forma “ipoattiva” (26%)**
 - P. torpido, con ridotta attività psicomotoria
- **Forma “mista” (42%)**
 - Alternanza di forme durante il giorno o nell’episodio
- **Forma “non classificabile” (10%)**
 - Senza disturbi psicomotori

Diagnosi differenziale

Il 32-67 % delle forme non viene riconosciuto o è misdiagnosticato.

- Psicosi dissociativa
- Psicosi distimica (41% delle forme di delirium è erroneamente diagnosticato come depressione)
Farrell Arch Intern Med 1995
- Demenza
 - Malattia di Alzheimer
 - Malattia a Corpi di Lewy
 - Demenza vascolare
- Vasculopatia cerebrale acuta
- Altra Patologia del SNC (es.acatisia nella MdP)
- Crisi parziali complesse

CAM

(Confusion Assessment Method)

1. Acute change & fluctuation in mental status and behavior

AND

2. Inattention

AND :

EITHER

3. Disorganized thinking

OR

4. Altered consciousness (not alert)

Inouye SK et al. *Ann Intern Med* 1990;113:941-948.

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

DSM IV:

- ▶ Disturbance of consciousness (reduced clarity of awareness) with reduced ability to focus, sustain, or shift attention
- ▶ Change in cognition (memory, disorientation, language) or the development of a perceptual disturbance not better accounted for by pre-existing dementia
- ▶ Disturbance develops over short time period and tends to fluctuate over course of day
- ▶ Evidence from history, physical exam, or lab that the cognitive disturbance is caused by direct physiologic consequences of a medical condition, substance, medication use, or multiple etiologies

Da: Gail Greendale, MD, Brandon Koretz, MD, Lecture, UCLA.

CAM—confusion assessment method

- ▶ Diagnostic algorithm has four components:
 - 1) Acute onset and fluctuating course
 - 2) Inattention
 - 3) Disorganized thinking
 - 4) Altered level of consciousness
- ▶ To diagnose delirium, need 1 and 2 and either 3 or 4
- ▶ Positive Predictive Value: 90%
- ▶ Negative Predictive Value: 90-100%



Diagnostic Tools. 1

	Sensitivity	Specificity
• Confusion Assessment Method *	.46 -.92	.90 -.92
• Delirium Rating Scale **	.82 -.94	.82 -.94
• Clock draw	.87	.93
• MMSE (23/24 cutoff)	.52 -.87	.76 -.82
• Digit span test	.34	.90

* validated for delirium & capable of distinguishing delirium from dementia

** validated in screening delirium severity

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Diagnostic Tools. 2

MMSE & Clock draw


- Not designed for delirium
- Useful at separating “normal” from “abnormal”
- Not specific for distinguishing delirium from dementia
- May be useful as change from baseline

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

IS IT DELIRIUM OR PSYCHOSIS?

COMMON SIGNS OF DELIRIUM

COMMON SIGNS OF PSYCHOSIS DUE TO A PSYCHIATRIC DISORDER




Confusion about current time, date, place, or identity

Usually, awareness of time, date, place, and identity



Difficulty paying attention

Retention of ability to pay attention




Loss of recent memory

Retention of recent memory

Inability to think logically

Inability to think logically




Inability to perform simple calculations

Retention of ability to calculate

Preoccupations commonly inconsistent

Preoccupations often fixed and consistent



Hallucinations (if any) mostly visual or involving touch

Hallucinations (if any) mostly auditory

Fever or other signs of infection

History of previous psychiatric disturbances

Evidence of recent drug use

Drug use not necessarily involved



Tremor

Usually, no tremor

Delirium e Psicosi funzionali

	Delirium	Psicosi funzionali
Disorientamento	comune	raro
Allucinazioni	visive	auditive
Età avanzata	comune	rara
Patologie organiche preesistenti	comuni	rare
Demenza preesistente	comune	rara
Coscienza Attenzione	compromesse	normali
Ideazione	delirio a contenuto elementare	delirio a contenuto complesso
Memoria	compromessa	normale
EEG	80-90% con rallentamento	normale

Distinguishing delirium from dementia

	Delirium	Dementia
Onset	Acute or subacute	Insidious
Course	Fluctuating, usually revolves over days to weeks	Progressive
Conscious level	Often impaired, can fluctuate rapidly	Clear until later stages
Cognitive defects	Poor short term memory, poor attention span	Poor short term memory, attention less affected until severe
Hallucinations	Common, especially visual	Often absent
Delusions	Fleeting, non-systematised	Often absent
Psychomotor activity	Increased, reduced, or unpredictable	Can be normal

Delirium or dementia? Red flags in history and exam

Delirium	Dementia
Sudden onset	Insidious onset
Precise time of onset	Uncertain time of onset
Usually reversible	Slowly progressive
Short duration (usually days to weeks)	Long duration (years)
Fluctuations (usually over minutes to hours)	Good days and bad days
Abnormal levels of consciousness	Normal level of consciousness
Typically, an association with drug use or withdrawal or with acute illness	Typically, no association with drug use or acute illness
Almost always worse at night (sundowning)	Often worse at night
Inattention	Attention not sustained
Variable disorientation	Disorientation to time and place
Typically slow, incoherent, and inappropriate language	Possible difficulty finding the right word
Impaired but variable recall	Memory loss, especially for recent events

Patients can attend to MMSE or clock draw, but cannot perform well

Often patients cannot attend to MMSE or clock draw

Allucinations (common in LBD) !

DELIRIUM

**different from
or
Superimposed
to**

DEMENTIA



Delirium superimposed on dementia: a systematic review.

Fick DM, Agostini JV, Inouye SK.

- **Fourteen studies** were reviewed, including seven prospective studies, three retrospective studies, two cross-sectional studies, and two clinical trials.
- The **prevalence** of delirium superimposed on dementia **ranged from 22% to 89%** of hospitalized and community populations aged 65 and older with dementia.
- Studies examining outcomes have found that adverse events are associated with delirium in persons with dementia, including **accelerated and long-term cognitive and functional decline**, need for institutionalization, rehospitalization, and increased mortality.
- The importance of early recognition and prevention of delirium in persons with dementia is stressed.

J Am Geriatr Soc. 2002 Oct;50(10):1723-32.

Quantifying fluctuation in dementia with Lewy bodies, Alzheimer's disease, and vascular dementia

M.P. Walker, PhD; G.A. Ayre, PhD; J.L. Cummings, MD; K. Wesnes, PhD; I.G. McKeith, MD;
J.T. O'Brien, DM; and C.G. Ballard, MD

NEUROLOGY 2000;54:1616–1624

Study: A total of 155 subjects (61 with Alzheimer Disease, 37 with DLB, 22 with vascular dementia, 35 elderly controls) received clinical evaluation for Fluctuating Cognition using a semiquantified measure applied by experienced Clinicians (**Fluctuation Inventory Scale 1**), 90-second cognitive choice reaction time (CRT), vigilance reaction time (VIGRT) trials, evaluation of mean EEG frequency across 90 seconds.

Conclusions: **Fluctuating Cognition is significantly more common and severe in DLB than in other major dementias.** The periodicity of FC is different in DLB and VaD cases, with important implications for the underlying causal mechanisms and for differential diagnosis.

Table 4 Comparative analyses using clinical and cognitive fluctuating cognition assessments: dementia cohorts versus controls

Variable	Dementia, n = 120	Controls, n = 35	Statistical evaluation
Fluctuation Inventory, scale 1, mean \pm SD	<u>3.3 \pm 3.8</u>	<u>0 \pm 0</u>	$t = 5.07, p < 0.0001^*$
Choice reaction time (CRT) variability (SD)	466.8 \pm 712.9 (CV = 37.1)	99.4 \pm 32.9 (CV = 18.3)	$t = 3.04, p = 0.003^*$ ($t = 2.66, p = 0.008^*$)
Vigilance variability (SD)	115.7 \pm 53.7 (CV = 18.6)	64.7 \pm 21.3 (CV = 12.8)	$t = 5.5, p < 0.0001^*$ ($t = 3.34, p = 0.001^*$)
Overall attentional performance (CRT SD \times vigilance SD)	65,644 \pm 118,916	7861 \pm 8312	$t = 2.9, p = 0.005^*$

* Statistically significant.

CV = coefficient of variation.

Table 3 Comparative analyses using clinical and cognitive fluctuating cognition assessments: vascular dementia (VaD) versus AD

Variable	VaD, n = 22	AD, n = 61	Statistical evaluation
Fluctuation Inventory, scale 1, mean \pm SD	<u>3.1 \pm 3.3</u>	<u>1.1 \pm 2.6</u>	$t = 3.10, p = 0.002^*$
Choice reaction time (CRT) variability (SD)	551.9 \pm 1001.6 (CV = 34.52)	218.4 \pm 146.2 (CV = 28.4)	$t = 2.53, p = 0.01^*$ ($t = -1.27, p = 0.20$)
Vigilance variability (SD)	98.4 \pm 33.3 (CV = 14.7)	113.1 \pm 45.2 (CV = 18.7)	$t = -1.39, p = 0.17$ ($t = -1.59, p = 0.11$)
Overall attentional performance (CRT SD \times vigilance SD)	67,267 \pm 118,393	25,259 \pm 20,882	$t = 2.4, p = 0.02$

* Statistically significant.

CV = coefficient of variation.

Patients with DLB had a greater prevalence and severity of Fluctuating cognition (FC) than did patients with AD or VaD rated using clinical, attentional, and EEG measures. (1)

Table 1 Comparative analyses using clinical and cognitive fluctuating cognition assessments: dementia with Lewy bodies (DLB) versus AD

Variable	DLB, n = 37	AD, n = 61	Statistical evaluation
Fluctuation Inventory, scale 1, mean ± SD	7.1 ± 3.4	1.1 ± 2.6	$t = 10.5, p < 0.0001^*$
Choice reaction time (CRT) variability (SD)	818.9 ± 900.0 (CV = 53.2)	218.4 ± 146.2 (CV = 28.4)	$t = 5.1, p < 0.0001^*$ $(t = 2.2, p < 0.03^*)$
Vigilance variability (SD)	130.3 ± 71.0 (CV = 20.9)	113.1 ± 45.2 (CV = 18.7)	$t = 1.45, p = 0.15$ $(t = 0.96, p = 0.33)$
Overall attentional performance (CRT SD × vigilance SD)	134,250 ± 173,871	25,259 ± 20,882	$t = 4.85, p < 0.0001^*$

* Statistically significant.

CV = coefficient of variation.

Table 2 Comparative analyses using clinical and cognitive fluctuating cognition assessments: dementia with Lewy bodies (DLB) versus vascular dementia (VaD)

Variable	DLB, n = 37	VaD, n = 22	Statistical evaluation
Fluctuation Inventory, scale 1, mean ± SD	7.1 ± 3.4	3.1 ± 3.3	$t = 4.4, p < 0.0001^*$
Choice reaction time (CRT) variability (SD)	818.9 ± 900.0 (CV = 53.2)	551.9 ± 1001.6 (CV = 34.52)	$t = 1.1, p = 0.29$ $(t = 1.4, p = 0.14)$
Vigilance variability (SD)	130.3 ± 71.0 (CV = 20.9)	98.4 ± 33.3 (CV = 14.7)	$t = 2.3, p = 0.02$ $(t = 2.6, p < 0.01^*)$
Overall attentional performance (CRT SD × vigilance SD)	134,250 ± 173,871	67,267 ± 118,393	$t = 1.7, p = 0.09$

* Statistically significant.

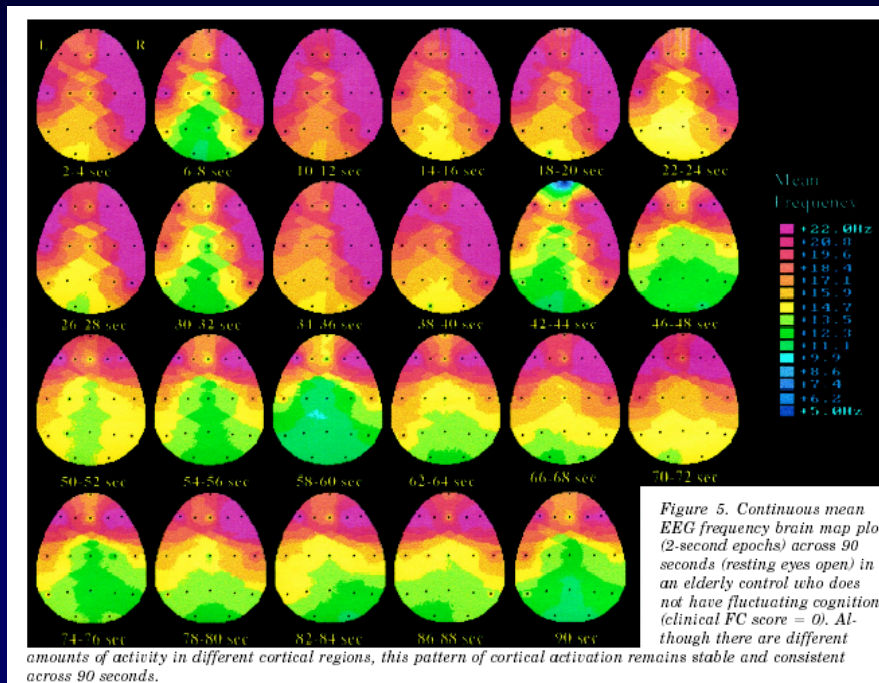
CV = coefficient of variation.

Patients with DLB had a greater prevalence and severity of Fluctuating cognition (FC) than did patients with AD or VaD rated using clinical, attentional, and EEG measures. (2)

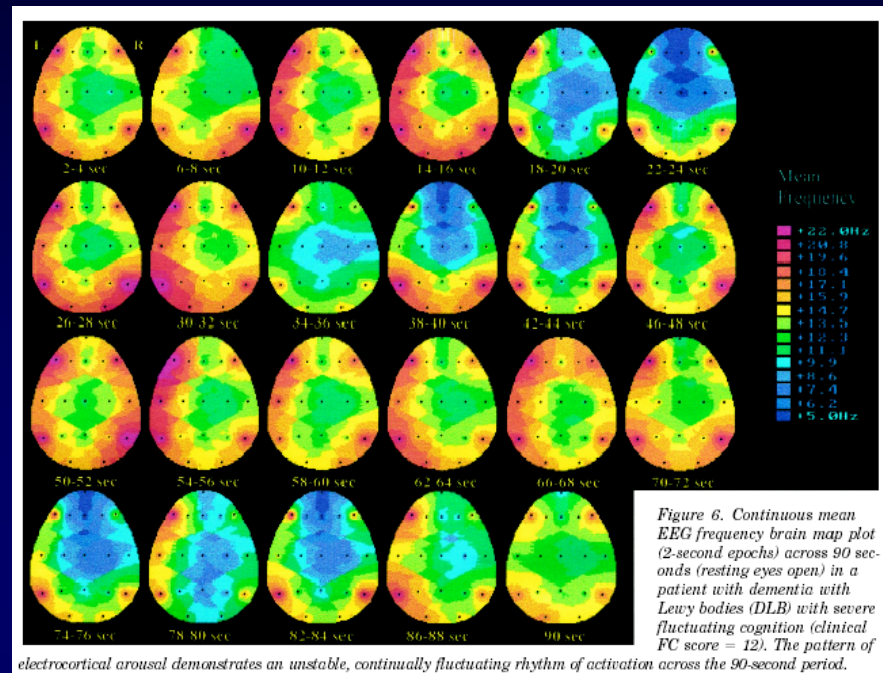
Fluctuating Cognition Rating Scale Inventory (FI scale 1). Discrimination between the dementia groups.

	DLB vs AD	DLB vs VaD	VaD vs AD
Sensitivity	81%	81%	64%
Specificity	92%	82%	77%

Normal aging



Lewy Body Disease



Continuous mean EEG frequency brain map plot (2-second epochs) across 90 second periods (resting eyes open).

**No fluctuating cognition (clinical FC score = 0).
Although there are different amounts of activity in different cortical regions, this pattern of cortical activation remains stable.**

**Severe fluctuating cognition (clinical FC score = 12).
The pattern of electrocortical arousal demonstrates an unstable, continually fluctuating rhythm of activation**

DLB fluctuations

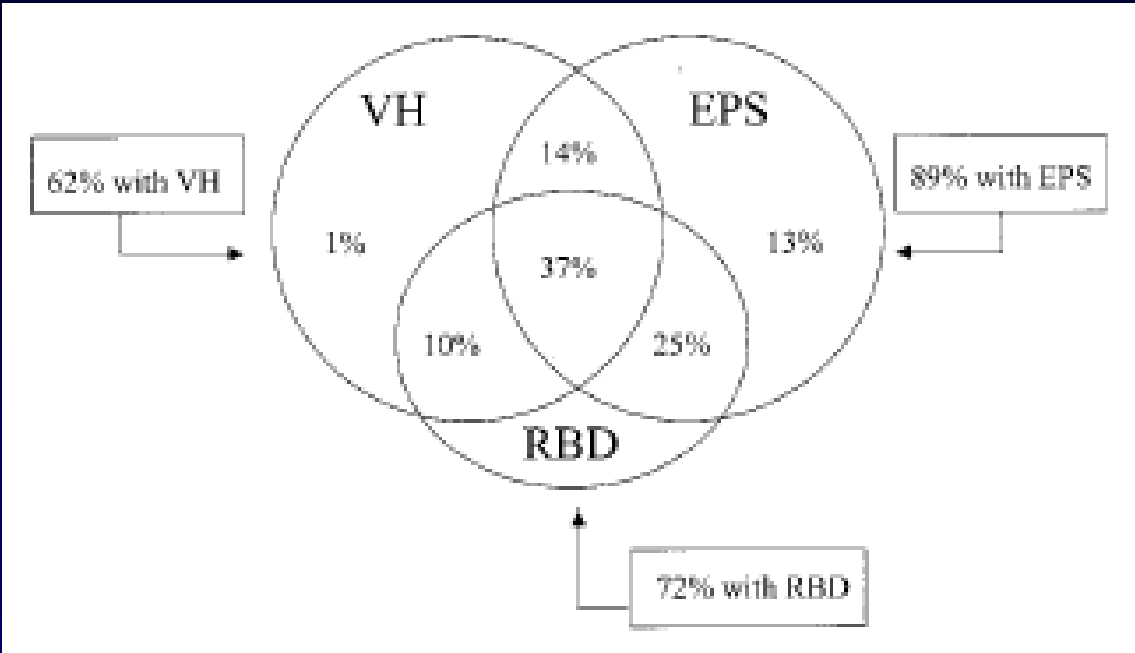
Specific features that reliably differentiate DLB from AD and normal aging

T.J. Ferman, PhD; G.E. Smith, PhD; B.F. Boeve, MD; R.J. Ivnik, PhD; R.C. Petersen, MD, PhD; D. Knopman, MD; N. Graff-Radford, MBBCh, MRCP; J. Parisi, MD; and D.W. Dickson, MD

NEUROLOGY 2004;62:181-187

Study: 200 community-dwelling cognitively normal elderly persons, 70 DLB patients, and 70 AD patients with collateral informants. A 19-item questionnaire was administered to the informants that queried about symptoms of fluctuations and delirium (**Composite Score 0 - 4**).

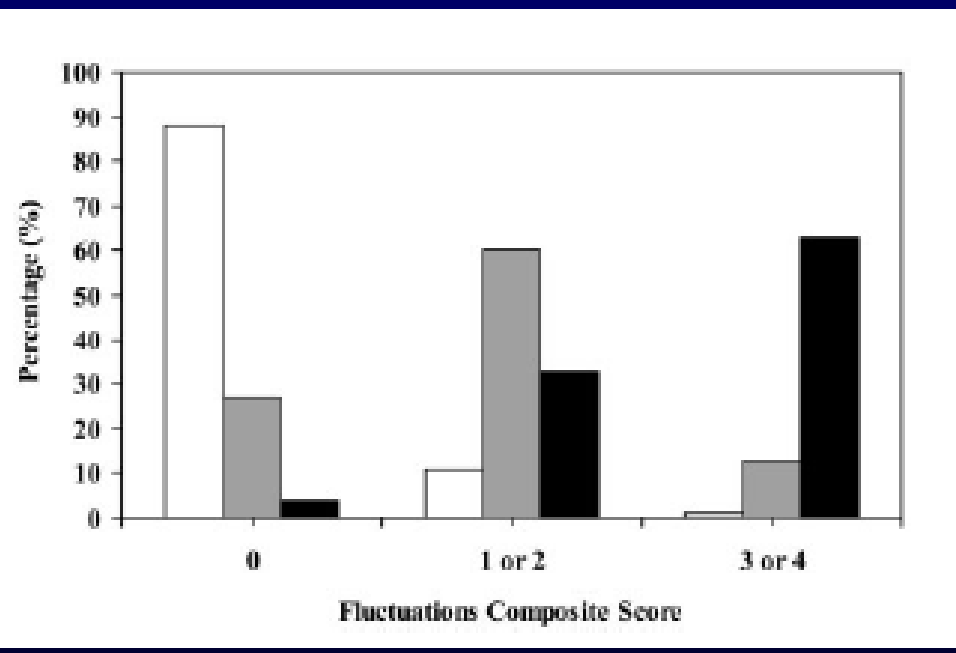
Conclusions: Based on **Composite Score**, disturbed arousal and disorganized speech are specific aspects of fluctuations in dementia with Lewy bodies that reliably distinguish dementia with Lewy bodies from Alzheimer's disease and normal aging.



Frequency of combined clinical symptoms in Lewy Body Disease.
VH: visual hallucinations
EPS: extrapiramidal s.
RBD: REM sleep behavior disorders

- Controls**
- Alzheimer Disease**
- Lewy Body Disease**

Newcastle brief semistructured interview (administered to informants).
Composite Score of amount and severity in delirium fluctuations: 0 to 4



Fluctuations in attention

PD dementia vs DLB with parkinsonism

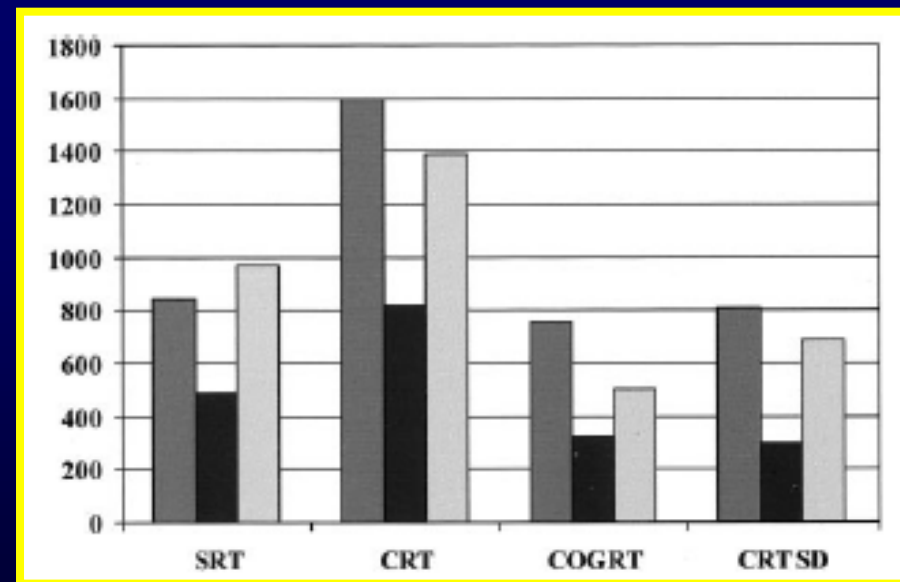
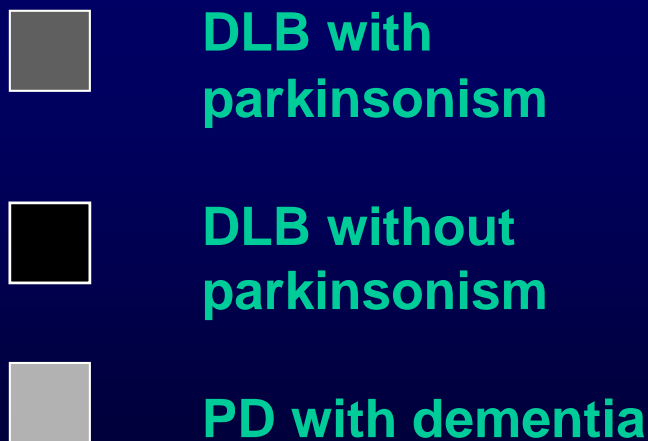
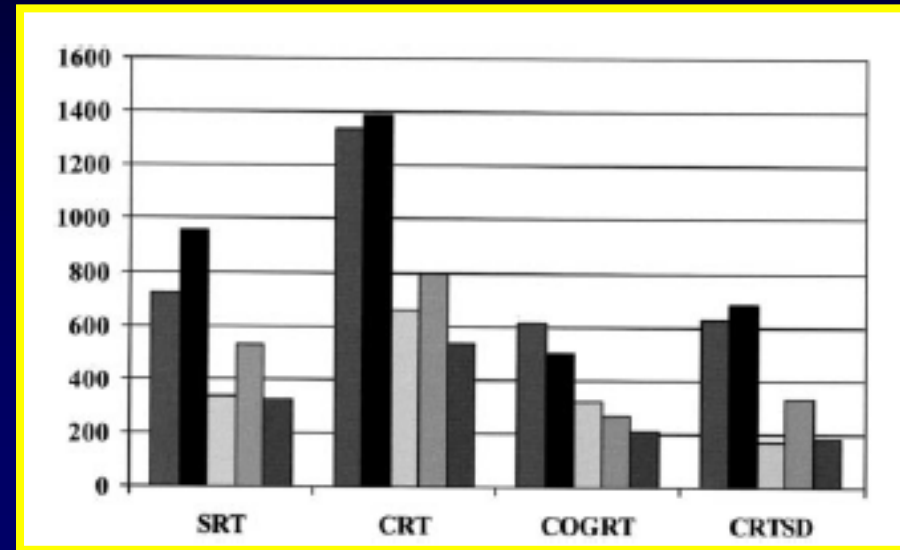
C.G. Ballard, MRCPsych, MD; D. Aarsland, MD; I. McKeith, FRCPsych, MD; J. O'Brien, MRCPsych, DM;
A. Gray, PhD; F. Cormack, BSc; D. Burn, MRCP, MD; T. Cassidy, MRCP; R. Starfeldt, BSc;
J.-P. Larsen, MD; R. Brown, PhD; and M. Tovee, PhD

NEUROLOGY 2002;59:1714-1720

Study: Evaluations of attention and fluctuating attention (Cognitive Drug Research computerized battery) in 278 subjects (50 DLB, 48 PD dementia, 50 PD, 80 AD, 50 elderly controls) from the Newcastle dementia and the Stavanger PD Register.

Conclusions: The profile of attentional impairments and fluctuating attention is similar in PD dementia and DLB with parkinsonism. The current findings do not support the current arbitrary distinctions between these patient groups. Importantly, patients with pure PD do not experience fluctuating attention. Dementia and fluctuations in attention correlate in PD dementia.

REACTION TIMES (milliseconds) IN DIFFERENT TESTS



SRT: Simple Reaction Time. CRT: Choice Reaction Time.
 COGRT: Cognitive Reaction Time CRTSD: Cognitive RT Standard Deviation

Delirium in the first days of acute stroke.

Caeiro L, Ferro JM, Albuquerque R, Figueira ML

- Assessment of delirium prospectively in a sample of 218 consecutive patients (mean age 57 years) with an acute (≤ 4 days) stroke (28 subarachnoid haemorrhages, 48 intracerebral haemorrhages, 142 cerebral infarcts) and in a control group of 50 patients with acute coronary syndromes.
- 13% of acute stroke patients and only 2 % of acute coronary patient had delirium (chi square $p = 0.02$).
- Delirium was secondary to stroke without any additional cause in 1/3, secondary also to medical complications in 1/3 and secondary to other multiple potential causes in 1/3.
- Delirium was more frequent after hemispherical than after brainstem/cerebellum strokes ($p = 0.02$)
- **CONCLUSION:** Delirium is more frequent in stroke than in coronary acute patients; it is not a non-specific consequence of acute disease and hospitalisation and it is secondary to hemisphere brain damage and to metabolic disturbances due to medical complications.

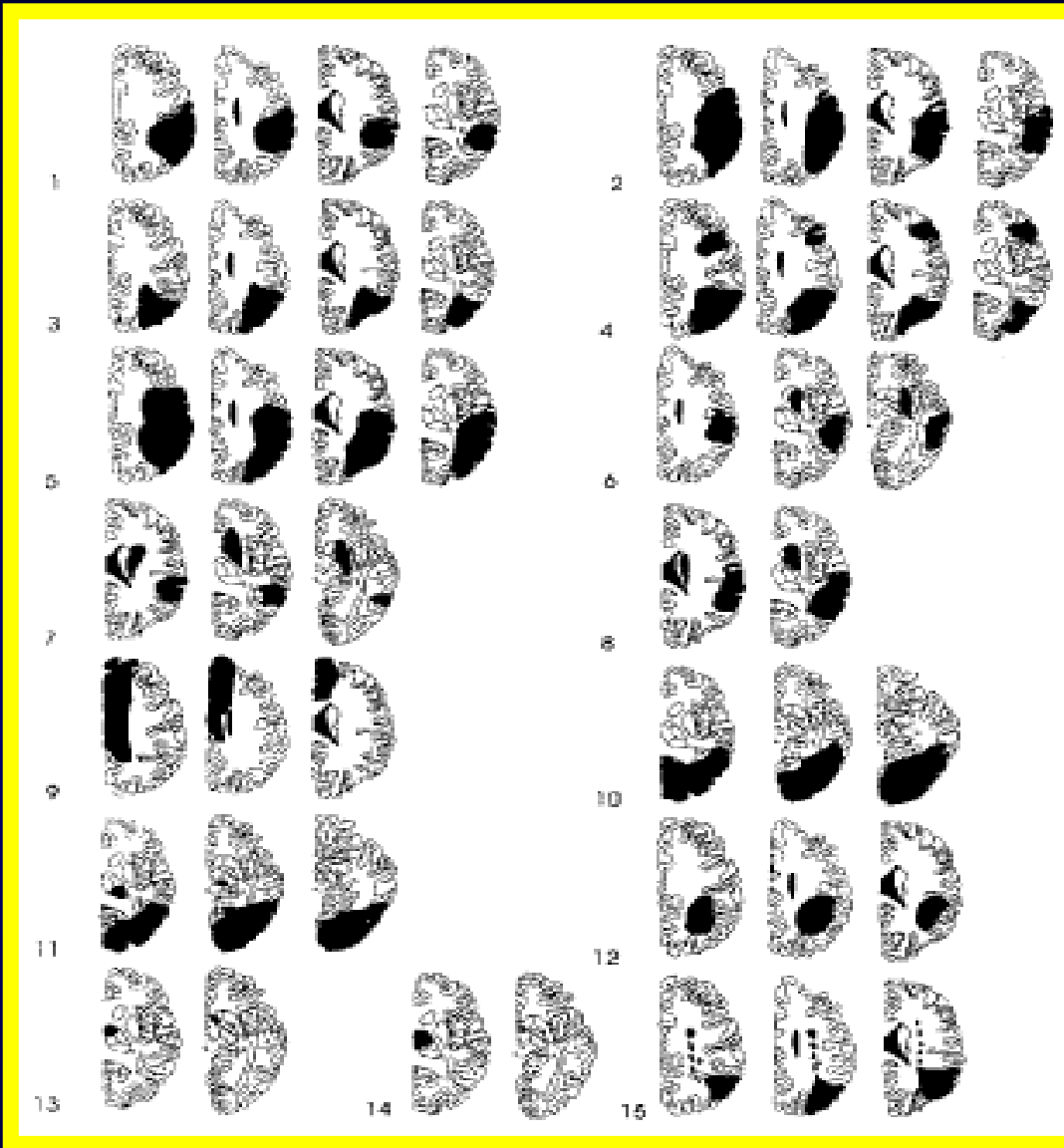
J Neurol. 2004 Feb 251(2):171- 178.

Delusional state following acute stroke

Emre Kumral, MD; and Özgür Öztürk, MD

NEUROLOGY 2004;62:110–113

Abstract—Delusional Ideations were seen in 15 patients in a prospective cohort population (n 360) with acute stroke admitted within 24 hours of onset. Specific Delusional Ideations may occur during the acute stroke phase, but atypical forms with distinct behavioral findings have also been observed. Delusional Ideations are associated with right posterior temporoparietal lesions. However, distinct lesions were also seen, and duration was relatively short, mostly less than 1 month.



15 right handed patients (among a cohort of 360)

Lesion NMRi T2 topography of patients with delusional ideation.

erotomania, grandiose ideation, jealousy, persecutory thought, somatic delusions, atypical delusional form, including Fregoli's phenomenon (caregiver is taking a variety of faces) and Cotard's syndrome (patient believes that he or she has lost everything).

Delirium Risk. Some Patient's Risk Factors

- Age
- Cognitive impairment
 - 25% delirious are demented
 - 40% demented in hospital became delirious
- Male gender
- Severe illness (comorbidities)
- Hip fracture
- Fever or hypothermia
- Hypotension
- Malnutrition
- High number of medications
- Sensory impairment
- Psychoactive medications
- Use of lines and restraints
- Metabolic disorders:
 - Azotemia
 - Hypo- or hyperglycemia
 - Hypo- or hypernatremia
- Depression
- Alcoholism
- Pain

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

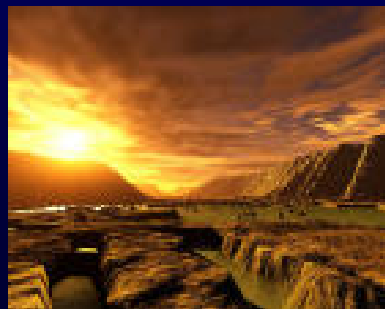
Fattori di rischio

Risk Factor	Unadjusted Odds Ratio
Pre-existing dementia	5.2
Severe medical illness	3.8
Alcohol abuse	3.3
Diminished ADL	2.5
Abnormal serum sodium	2.2
Male gender	1.9
Depression	1.9
Hearing impairment	1.9
Visual impairment	1.7

Da: Gail Greendale, MD, Brandon Koretz, MD, Lecture, UCLA.

Major causes of delirium. Metabolic and Medical disorders

- Hepatic encephalopathy
- Uremia
- Hypoglycemia
- Hypoxia
- Hypo / hypernatremia
- Hypo / hypermagnesiemia
- Other electrolyte disturbances
- Acidosis
- Hyper/hypoosmolarity
- Phorphyria
- Infections (AIDS)



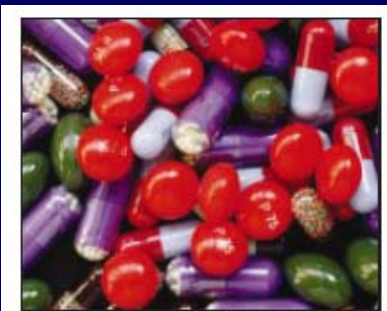
- Toxic and industrial exposures
 - Carbon monoxide
 - Organic solvents
 - Lead
 - Manganese
 - Mercury
 - Carbon disulfide
 - Heavy metals
- Vitamin deficiencies
 - Thiamine
 - B12
 - Nicotinic acid
 - Folic acid
- Endocrinopathies
 - Thyroid
 - Parathyroid
 - Pituitary

Major causes of delirium. Drug related.

- Alcohol
- Caffeine
- Hallucinogens
- Inhalants
- Amphetamines
- Cocaine
- Meperidine and other narcotics
- Antiparkinson drugs
- Sedative hypnotics
- Steroids
- Anticholinergics
- Antihistaminics
- Cimetidine
- Disulfiram
- Cardiovascular agents
 - Beta-blockers
 - Clonidine
 - Digoxin



Alcohol addiction often goes undetected at the time of admission to hospital. All admitted patients should be asked about their alcohol consumption



Excessive use of sedative drugs often causes more problems that it solves

- Anti-infectious agents
 - Acyclovir
 - Amphotericin B
 - Cephalexin
 - Chloroquine
 - Isoniazide
 - Rifampicin

- Psychotropics
 - Phenothiazine
 - Clozapine
 - Lithium
 - Tricyclics
 - Trazodone
- Cytotoxic antineoplastics
- Anticonvulsants
 - Phenobarbital
 - Phenytoin
 - Valproate
 - Carbamazepine
- Salicylate
- Ergot alkaloids
- Methyldopa
- Withdrawal syndromes
 - Alcohol
 - Benzodiazepines
 - Barbiturates

Major causes of delirium. Neurological disorders

- Dementia
 - Lewy Body Disease
 - Alzheimer Disease
 - Vascular dementia
- Infections
 - Meningitis
 - Encephalitis
 - Brain abscess
 - Neurosyphilis
 - Lyme neuroborreliosis
 - Cerebritis
 - Systemic infections with septicemia



Simple measures to help orientation (such as glasses, hearing aids, and clocks) are effective in the management of delirium



- Stroke
- Hypoperfusion
Hypoxia
 - Hyperviscosity
 - Cardiovascular
 - Respiratory
- Epilepsy
- Head Injury
- Hypertensive Encephalopathy
- Brain Tumors
- Migraine
- Cerebral vasculitis
- Paraneoplastic limbic encephalitis
- Trauma
- Sensory deprivation

Major causes of delirium. Peri (intra-post) operative - Due to Hospitalization (Intensive care Unit).

- Specific surgery
 - Cardiac
 - Orthopedic (femoral neck / hip fracture)
 - Ophthalmologic
- Anesthetic and drug effects
- Hypoxia
- Anemia (Low Hb and Htc)
- Feeding isorders
- >3 new drugs



In postoperative patients judicious use of oxygen can treat delirium effectively

Old (>65 yrs)
• at surgery
• in intensive
care unit:

- 31% on admission, 30% during stay
- **have or develop delirium**

- Hyperventilation
- Fluid and electrolyte disturbances
- Hypotension
- Haemorrhage
- Embolism
- Blood transfusion
- Infections or sepsis
- Fragmented sleep
- Sensory deprivation
- Sensory overload
- Constriction
- Procedures
 - Xray, samples

Surgical Prediction Rule

- | | |
|--|---|
| • Alcohol abuse | 1 |
| • Telephone Interview for Cognitive Sstatus score < 30 (poor cognitive status) | 1 |
| • Specific Activity Scale Class IV (severe functional impairment) | 1 |
| • Abnormal pre-operative Na, K, glucose | 1 |
| • Aortic aneurisms surgery | 2 |
| • Noncardiac thoracic surgery | 1 |
| • Age > 70 | 1 |

- Marcantonio et al. JAMA 1994 134-139

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Clinical Prediction Rule for Post-surgical Delirium

• Total Points	Risk of Delirium (incidence, validation cohort)
• 0	2 %
• 1 or 2	11 %
• 3 or more	50 %

– Marcantonio et al. JAMA 1994 134 -139

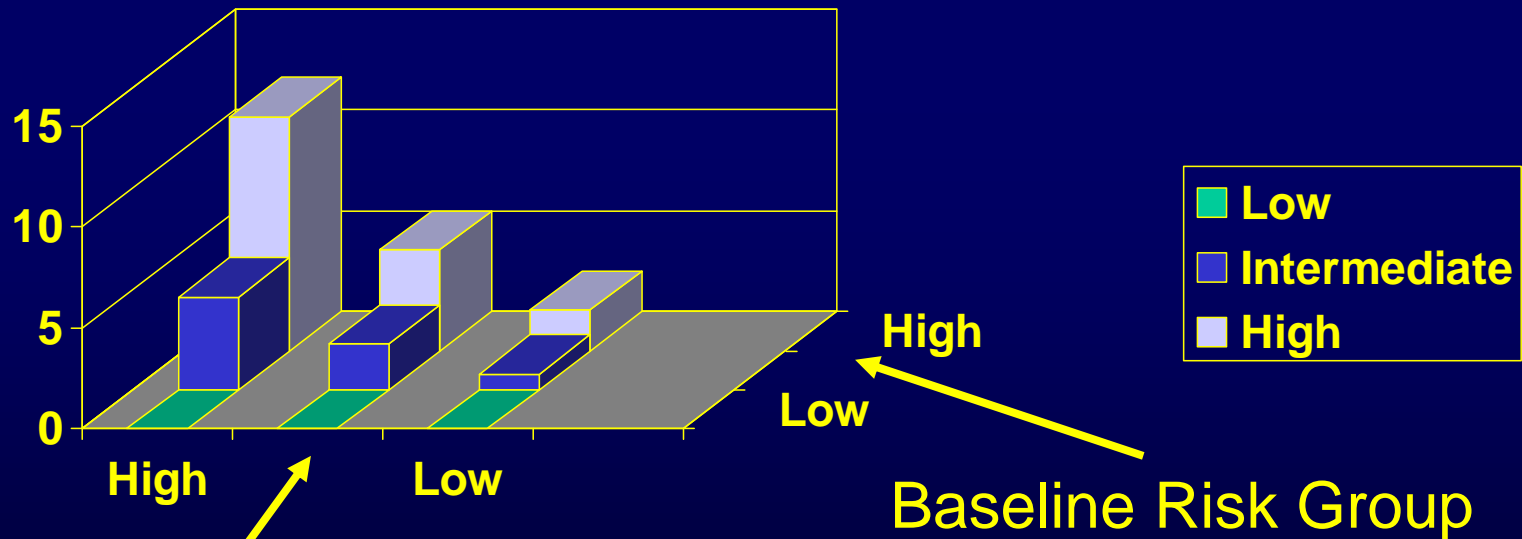
From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Delirium Risk Model

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Patient Factors + Extrinsic Factors

Incidence of delirium per day

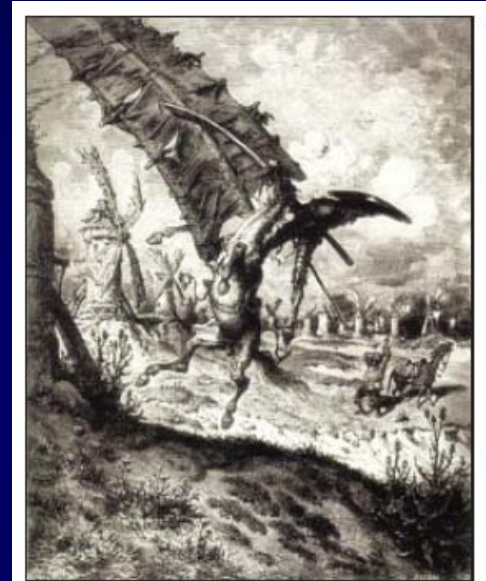


Precipitating Factor Group

Inouye JAMA 1996

Pathophysiology

- **Nonspecific manifestation of a widespread reduction in cerebral metabolism & derangement of neurotransmission due to:**
 - **Cholinergic deficiency**
 - **GABA**
 - **Dopamine**
 - **NE**
 - **Specific receptors (e.g., steroid)**
 - **Alteration of blood flow**
 - **Inflammatory mediators**
 - **Derangement of polysynaptic pathways from reticular ascending formation to thalamus, prefrontal cortex, posterior parietal cortex**



Sensory misperceptions, including hallucinations and illusions, are common in delirium. (*Don Quixote and the Windmill* by Gustave Doré, 1832-1883)

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Cholinergic deficits contribute to behavioral disturbance in patients with dementia

S.L. Minger, PhD; M.M. Esiri, FRCPath; B. McDonald, MRCPath; J. Keene, DPhil; J. Carter; T. Hope, FRCPsych; and P.T. Francis, PhD

NEUROLOGY 2000;55:1460–1467

Results: ChAT activity, but no other neurochemical markers, was reduced in AD compared with controls. Loss of ChAT activity correlated with cognitive impairment. Lowered ChAT activity also correlated with increasing overactivity in patients with dementia in both frontal and temporal cortex whereas ChAT:DA and ChAT:D1 ratios in temporal cortex correlated negatively with aggressive behavior.

Conclusions: Disturbance of the cholinergic system may underlie both cognitive and some noncognitive behavioral changes in dementia, providing a basis for rational therapy.

EEG spectral analysis in delirium

H Koponen, J Partanen, A Paakkonen, E Mattila and
PJ Riekkinen

- Spectral analysis of EEG in 51 elderly delirious patients (DSM-III criteria) and in 19 controls.
- As a whole group, patients showed significant reductions of alpha percentage, increased theta and delta activity and slowing of the peak and mean frequencies and these changes were also obvious in individual recordings.
- The alpha percentage and various ratio parameters correlated significantly with Mini Mental State score, and delta percentage and mean frequency with the lengths of delirium and hospitalisation.
- The results indicate an association between spectral EEG changes and severity of cognitive deterioration in delirium.

JNNP 1989, Vol 52, 980-985

Conventional and quantitative EEG in the diagnosis of delirium among the elderly

SA Jacobson, AF Leuchter and DO Walter

- Quantitative EEG (QEEG) could assist in the differential diagnosis of encephalopathy among elderly subjects with delirium, dementia, and delirium coexistent with dementia.
- Thirty four subjects from 57 to 93 years had standard 17-channel EEG and quantitative EEG studies independently rated by two raters blind to clinical diagnosis.
- Variables which collectively distinguished normal from encephalopathic records were Mini-Mental State Examination scores and relative power in the alpha frequency band.
- Variables which collectively distinguished delirium from dementia were EEG theta activity, relative power in delta, and brain map rating.
- The results suggest that cross-sectional QEEG study is potentially useful in the early differential diagnosis of encephalopathy, and that the variables which distinguish normal from encephalopathic patients differ from the variables which distinguish delirium from dementia.

JNNP 1993, Vol 56, 153-158

Outcomes

- Death: 8% vs. 1%, 90 day mortality 11% vs. 3%
- Lengthened hospital stay: 12 days vs. 7 days
- Increased nursing home placement: 16% vs. 3%
- Functional decline
- Iatrogenesis

Francis J et al. JAMA 1990;263:1097.

Levkoff SE et al. Arch Intern Med 1992;152:334

Pompei et al. JAGS 1994; 42: 809



From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Delirium predicts 12-month mortality.

McCusker J, Cole M, Abrahamowicz M, Primeau F, Belzile E.

- **RESULTS:** The unadjusted hazard ratio of delirium with mortality was 3.44 (95% confidence interval, 2.05-5.75); the adjusted hazard ratio was 2.11 (95% confidence interval, 1.18-3.77). The effect was stronger among patients without dementia.
- **CONCLUSION:** Delirium is an independent marker for increased mortality among older medical inpatients during the 12 months after hospital admission. It is a particularly important prognostic marker among patients without dementia.

Arch Intern Med. 2002 Feb 25;162(4):457-63.

Delirium in older emergency department patients discharged home: effect on survival.

Kakuma R, du Fort GG, Arsenault L, Perrault A, Platt RW, Monette J, Moride Y, Wolfson C.

- **RESULTS:** The analysis revealed a statistically significant association between delirium and mortality after adjustments for age, sex, functional level, cognitive status, comorbidity, and number of medications for the first 6 months of follow-up
- **CONCLUSION:** The results of this study suggests that nondetection of delirium in the ED may be associated with increased mortality within 6 months after discharge.

J Am Geriatr Soc. 2003 Apr;51(4):443-50.

Searching for the cause

- Diseases
 - Cardiac, pulmonary, hematologic-oncologic, renal, hepatic, metabolic, Endocrinologic, Infectious
- Environmental
 - Sleep deprivation, pain, post-op, unfamiliar surroundings
- Other considerations
 - Neurologic
 - Mass, trauma, vascular, CNS infections, seizure/post-ictal state
 - Withdrawal
 - Drug, alcohol
 - Industrial exposures
 - Psychiatric illness
- Drugs (not an exhaustive drug list; major and common offenders only)
 - Benzodiazepines
 - Alcohol
 - CNS depressants or stimulants
 - Digoxin
 - Cimetidine (or other H2 blockers)
 - Central anti-hypertensives
 - Anticholinergics:
 - Anti-histamines
 - Anti-Parkinsons drugs
 - Tricyclic antidepressants
 - Muscle or bladder relaxants

**Delirium:
Optimising
management**

Regular Review

**David J
Meagher**

**BMJ, 222, 144-
149, 2001**

Summary points

Delirium is especially common in elderly patients and poses a substantial challenge for clinicians

Delirium comprises a wide of range of symptoms, but the prevailing narrow definition impedes diagnosis and efforts to improve treatment

Diagnosis can be improved by clinicians becoming more aware of hypoactive presentations, incorporating cognitive assessment into routine practice, and using simple screening instruments

Environmental strategies for treatment are free of adverse effects but are underutilised

Neuroleptics (such as haloperidol) continue to be used as first line treatment, but benzodiazepines are indicated in specific situations

Risk factors for delirium

Patient's factors

Individual:

- Age
- Pre-existing cognitive deficit
- Severe comorbidity
- Previous episode of delirium
- Personality before illness

Perioperative:

- Course of postoperative period
- Type of operation (for example, hip replacement)
- Emergency operation
- Duration of operation

Specific conditions:

- Burns; AIDS; fracture; hypoxaemia; organ insufficiency; infection; metabolic disturbances (for example, dehydration, low serum albumin concentration)

Stop

Change

Pharmacological factors

- Treatment with many drugs
- Dependence on drugs or alcohol
- Use of psychoactive drugs or alcohol

Specific drugs that may cause problems

- Benzodiazepines
- Anticholinergic agents
- Narcotics

Environmental factors

- Extremes in sensory experience (for example, hypothermia)
- Deficits in vision or hearing
- Immobility or decreased activity
- Social isolation
- Novel environment
- Stress

Know

Evaluate

Treat

Environmental factors in treating delirium

Providing support and orientation

Communicate clearly and concisely; give repeated verbal reminders of the day, time, location, and identity of key individuals, such as members of the treatment team and relatives

Provide clear signposts to patient's location including a clock, calendar, chart with the day's schedule

Have familiar objects from the patient's home in the room

Ensure consistency in staff (for example, a key nurse)

Use television or radio for relaxation and to help the patient maintain contact with the outside world

Involve family and caregivers to encourage feelings of security and orientation



Simple measures to help orientation (such as glasses, hearing aids, and clocks) are effective in the management of delirium

Regular review

Delirium: optimising management

David J Meagher

Environmental factors in treating delirium

Providing an unambiguous environment

Simplify care area by removing unnecessary objects; allow adequate space between beds

Consider using single rooms to aid rest and avoid extremes of sensory experience

Avoid using medical jargon in patient's presence because it may encourage paranoia

Ensure that lighting is adequate; provide a 40-60 W night light to reduce misperceptions

Control sources of excess noise (such as staff, equipment, visitors); aim for < 45 decibels in the day and < 20 decibels at night

Keep room temperature between 21.1°C to 23.8°C

Regular review

Delirium: optimising management

David J Meagher

Environmental factors in treating delirium

Maintaining competence

Identify and correct sensory impairments; ensure patients have their glasses, hearing aid, dentures. Consider whether interpreter is needed

Encourage self care and participation in treatment (for example, have patient give feedback on pain)

Arrange treatments to allow maximum periods of uninterrupted sleep

Maintain activity levels: ambulatory patients should walk three times each day; non-ambulatory patients should undergo a full range of movements for 15 minutes three times each day



Simple measures to help orientation (such as glasses, hearing aids, and clocks) are effective in the management of delirium

Regular review

Delirium: optimising management

David J Meagher

Can Interventions Prevent Delirium? 1.

103 treatment and 111 controls

Intervention: Surgery as soon as possible and geriatric evaluation pre and post operation vs usual care.

Outcomes	Treatment	Control
Severe Confusion	7%	30%
Confusion	48%	61%
Length Of Stay	11.6 days	17.4 days



Gustafson et al JAGS 1991

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Can Interventions Prevent Delirium? 2.

A Multicomponent Intervention to Prevent Delirium in Hospitalized Older Patients

- 852 patients aged 70+
- Prospective matching of patients on intervention unit with patients on 2 usual care units
- Risk factor reduction strategy targeting:
 - cognitive impairment
 - sleep deprivation
 - immobility
 - visual impairment
 - dehydration

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Inouye NEJM 1999

Intervention Protocol



- Cognition
- Sleep

Orientation, activities

Bedtime drink,
massage, music, noise
reduction

- Immobility
- Vision

Ambulation, exercises

Visual aids and adaptive
equipment

- Hearing

Portable amplifiers,
cerumen disimpaction

- Dehydration

Blodd Nitrogen, volume
repletion

From: **Delirium in the Elderly**. Bree Johnston MD
MPH, UCSF Division of Geriatrics, Primary Care
Geriatric Lectures, University of California.

Inouye NEJM 1999

Results

Delirium	Study	Control	
Any episode	9.9%	15%	p=0.02
# episodes	62	90	p=0.03
Delirium days	105	161	p=0.02

Conclusions The risk-factor intervention strategy that we studied resulted in significant reductions in the number and duration of episodes of delirium in hospitalized older patients. The intervention had no significant effect on the severity of delirium or on recurrence rates. This finding suggests that primary prevention of delirium is probably the most effective treatment strategy.

From: **Delirium in the Elderly**. Bree Johnston MD
MPH, UCSF Division of Geriatrics, Primary Care
Geriatric Lectures, University of California.

Inouye NEJM 1999

Possible Benefit From:

- Preoperative psychiatric assessment followed by nursing reorientation (33% vs 14%)
- Postoperative nursing reorientation (87% vs 6%)
- Preoperative education about delirium (78% vs. 59%)
- Pre and post operative psychiatric intervention (13% vs 0)
 - British J. Psych 1996 512-515
 - Can Med Ass J 1994 965-70
 - Nurs Res 1974 341-348
 - Res Nurs Health 1985 329-337

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Reducing delirium after hip fracture: a randomized trial.

Marcantonio ER, Flacker JM, Wright RJ, Resnick NM.

- Randomized Clinical Trial of 126 patients
- Intervention:
 - “Proactive” Geriatric Consultation with Daily Visits and structured protocols
- Control Group:
 - Management by orthopedist + consultation on as-needed basis
- Outcomes: MMSE, delirium scale (Confusion Assessment Method), Length Of Stay in hospital

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

J Am Geriatr Soc. 2001
May;49(5):516-22.

- Protocols for:
 - Fluid/electrolytes
 - Pain treatment
 - Eliminating unnecessary medications
 - Bowel/bladder function
 - Nutrition
 - Mobilization
 - CNS oxygenation
 - Prevention of complications (Myocardial Infarction, Pulmonary Embolism, Urinary tract infection, pneumonia)
 - Environmental stimuli
 - Treatment of agitated delirium



In postoperative patients judicious use of oxygen can treat delirium effectively

Marcantonio, JAGS 2001

From: **Delirium in the Elderly**. Bree Johnston MD
MPH, UCSF Division of Geriatrics, Primary Care
Geriatric Lectures, University of California.

Delirium in Hip fracture

	Intervention	Control	P
Delirium, cumulative incidence	20 (32%)	32 (50%)	0.04
Severe delirium, cumulative incidence	7 (12%)	18 (29%)	0.02
Hospital Length of stay, days	5	5	NS
Delirium at discharge	8 (13%)	12 (19%)	NS

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Marcantonio JAGS 2001

Interventions that May Help

- Eliminate extra meds, reverse metabolic abnormalities, hydration, nutrition
- Geriatric consultation?
- Education of patients and family
- Re-orientation by staff, family, sitters, clocks, calendars
- Remove nonessential lines and tubes
- Quiet, noninterrupted sleep at night
- Stimulation (but not too much) during day
- Discharge home?

From: **Delirium in the Elderly**. Bree Johnston MD
MPH, UCSF Division of Geriatrics, Primary Care
Geriatric Lectures, University of California.

Drug therapy

- All drug therapy has side effects
- Use only if delirium interfering with therapy, or risking patient's or others' safety and welfare
- Almost no data on outcomes in drug treated versus non drug treated patients
- No good Randomized Controlled Trials
- Approach based on case reports and expert opinion

From: **Delirium in the Elderly**. Bree Johnston MD
MPH, UCSF Division of Geriatrics, Primary Care
Geriatric Lectures, University of California.

Pharmacological treatment of severe disturbance in delirium^{24-26 34 39}

- Administer 0.5-10 mg haloperidol (intramuscularly or intravenously) depending on level of disturbance and likely tolerance (having considered age, physical status, and risk of side effects)
- Observe patient for 20-30 minutes. If the patient remains unmanageable but has not had any adverse effects, double the dose and continue monitoring:
 - Repeat the cycle until an acceptable response occurs or side effects occur
 - Patient should be manageable not obtunded
- Up to 2 mg of lorazepam may be administered intravenously or intramuscularly every four hours and may be beneficial in allowing a lower dose of antipsychotics to be used in cases in which extrapyramidal side effects occur:
 - Monitor respiratory functions and level of sedation carefully
 - Consider administering flumazenil if there is evidence of significant toxicity
- Upper limits on doses have not been clearly established, but up to 100 mg of intravenous haloperidol every 24 hours is generally safe as is up to 60 mg intravenous haloperidol every 24 hours if benzodiazepines are used concomitantly

Drug Therapy of Delirium

- One small Randomized Controlled Trials of neuroleptics vs. benzos in AIDS associated delirium/dementia found higher Side Effects with benzos
- Improved outcomes with neuroleptics (N=67)
- Small sample, generalizability uncertain
 - Breitbart et al Am J Psych 1996 231-237

From: **Delirium in the Elderly**. Bree Johnston MD
MPH, UCSF Division of Geriatrics, Primary Care
Geriatric Lectures, University of California.

Neuroleptics

- Considered agents of choice for most cases of delirium
- Randomized Clinical Trials in agitation and dementia suggest benefit (NNT = 5)
- Side effects can include extrapyramidal Side Effects, hypotension, sedation, akathisia
- Sedation effect before antipsychotic effect
- Haloperidol, Droperidol
- Atypicals: Risperidone, Olanzapine

From: **Delirium in the Elderly**. Bree Johnston MD
MPH, UCSF Division of Geriatrics, Primary Care
Geriatric Lectures, University of California.

Use of Haloperidol

- Lowest possible dose, e.g., .5-1.0 BID tapering down as delirium clears
- 0.5mg, repeat every 30 minutes until agitation is controlled
- Some advocate doubling of dose every 30 minutes until agitation is controlled (probably not wise in elderly!)
- Droperidol can be used IV - more rapid onset
 - Caution: sedation, hypotension, less anti-psychotic than haloperidol

From: [Delirium in the Elderly](#). Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Atypical neuroleptics

- Risperidone: for those with side effects from haloperidol or contraindications
 - Starting dose: .5mg HS or BID
- Olanzapine: agent of choice for patients with PD with hallucinations/delirium
 - Starting dose 2.5mg PO HS or BID

Benzodiazepines

- Should usually be avoided
- Agents of choice for Ethanol and Benzos withdrawal
- More rapid onset than neuroleptics
- Peak effects brief, sedation more common, can prolong delirium
- May be useful in terminal delirium associated with high dose narcotics and myoclonus
- Lorazepam .5-1 mg IV or PO (t_{1/2} 15-20 hours)

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Other agents

- ?Trazadone 25-100mg
- Physostigmine (don't try this)
 - reverses delirium due to anticholinergic activity
 - SE's: bradycardia, asystole, bronchospasm, seizures
- ?Donepezil
- ?Mood stabilizers
- Narcotics and pain medications (empiric use in patients with dementia often helpful)

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Delirium in the ICU



In postoperative patients judicious use of oxygen can treat delirium effectively

Unlikely to be entirely preventable due to burden of illness, interventions, and environment

Restraints less humane than sedation (my opinion)

Sitters versus sedation?

Depth of sedation?

Sedative of choice?

Bottom Line: RCTs needed

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Sedation in the ICU

- Review of 32 studies of ICU sedation, 20 short term and 14 long term
- 20 compared propofol with midazolam
- Propofol may result in faster time to extubation, but higher rate of hypotension, higher cost
- Long term cognitive outcomes?
- Conclusion: More RCTs needed

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Osterman et al. JAMA 2000; 283: 1451-1459

Sedation in the ICU

- RCT of 128 inpatients receiving mechanical ventilation and continuous sedation in medical ICU
- Intervention: Interrupt sedation until patient awake on a daily basis versus usual care
- Duration of ventilation 4.9 vs 7.3 (p=0.004) in intervention vs control group
- Median Length of stay 6.4 vs 9.9 days (p=0.02)
 - Kress et al NEJM May 18, 2000

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

Prevention is the Best Medicine

- All evidence suggests that it is easier to PREVENT delirium than to TREAT delirium
- Prevention of delirium is least likely to be possible in the intensive care unit
- Treatment of delirium in the intensive care unit is particularly challenging and most likely to require medications, sitters, and/or physical restraints

From: **Delirium in the Elderly**. Bree Johnston MD MPH, UCSF Division of Geriatrics, Primary Care Geriatric Lectures, University of California.

REVIEW

Delirium: current trends in prevention and treatment

J. B. WEBER,¹ J. H. COVERDALE^{1,3} and M. E. KUNIK^{1,2}

¹Department of Psychiatry and Behavioral Sciences, Baylor College of Medicine and ²Center for Quality of Care and Utilization Studies, Veterans Affairs Medical Center, Houston, Texas, USA and ³Division of Psychiatry, University of Auckland, Auckland, New Zealand

Although it is associated with increased morbidity and mortality, it is often not recognised and treated by physicians.

Predisposing factors are believed to have multiplicative effects and include dementia, advanced age and male gender.

Recently developed models allow for the estimation of the risk of developing delirium during a hospitalisation, based on predisposing factors and acute additional stressors.

Although it has been shown to be efficacious, the prevention of delirium is underutilised.

Prevention consists of aggressive management of known risk factors and early detection.

Limited data exist to support specific pharmacological interventions for its treatment.

Multidisciplinary team interventions for delirium in patients with chronic cognitive impairment.

Britton A, Russell R.

Though much recent research has focused on the problem of delirium, the evidence is still difficult to utilize in management programmes. Research needs to be undertaken targeting specific groups known to be at high risk of developing delirium, for example the cognitively impaired and the frail elderly.

Delirium, though a frequent problem in hospitalized elderly patients, is still managed empirically and there is no evidence in the literature to support change to current practice at this time

Cochrane Database Syst Rev. 2000;(2):CD000395

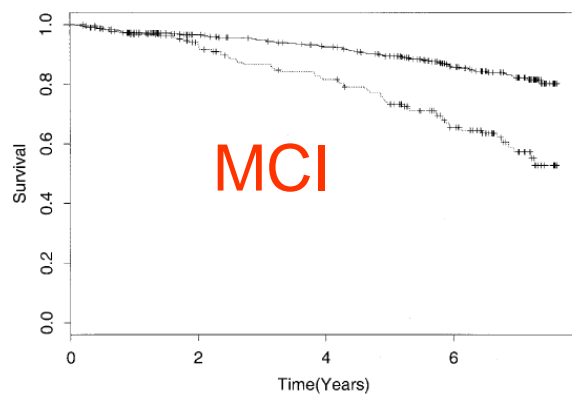
Cochrane Database Syst Rev. 2004;(2):CD000395

Natural history of mild cognitive impairment in older persons

D.A. Bennett, MD; R.S. Wilson, PhD; J.A. Schneider, MD; D.A. Evans, MD; L.A. Beckett, PhD; N.T. Aggarwal, MD; L.L. Barnes, PhD; J.H. Fox, MD; and J. Bach, MSW

Abstract—Background: Cognitive abilities of older persons range from normal, to mild cognitive impairment, to dementia. Few large longitudinal studies have compared the natural history of mild cognitive impairment with similar persons without cognitive impairment. **Methods:** Participants were older Catholic clergy without dementia, 211 with mild cognitive impairment and 587 without cognitive impairment, who underwent annual clinical evaluation for AD and an assessment of different cognitive abilities. Cognitive performance tests were summarized to yield a composite measure of global cognitive function and separate summary measures of episodic memory, semantic memory, working memory, perceptual speed, and visuospatial ability. The authors compared the risk of death, risk of incident AD, and rates of change in global cognition and different cognitive domains among persons with mild cognitive impairment to those without cognitive impairment. All models controlled for age, sex, and education. **Results:** On average, persons with mild cognitive impairment had significantly lower scores at baseline in all cognitive domains. Over an average of 4.5 years of follow-up, 30% of persons with mild cognitive impairment died, a rate 1.7 times higher than those without cognitive impairment (95% CI, 1.2 to 2.5). In addition, 64 (34%) persons with mild cognitive impairment developed AD, a rate 3.1 times higher than those without cognitive impairment (95% CI, 2.1 to 4.5). Finally, persons with mild cognitive impairment declined significantly faster on measures of episodic memory, semantic memory, and perceptual speed, but not on measures of working memory or visuospatial ability, as compared with persons without cognitive impairment. **Conclusions:** Mild cognitive impairment is associated with an increased risk of death and incident AD, and a greater rate of decline in selected cognitive abilities.

NEUROLOGY 2002;59:198–205



NO MCI

MCI

Figure 1. Kaplan-Meier curve showing risk of death among persons with mild cognitive impairment (dotted line) compared with those without cognitive impairment (solid line).