

# *Delirium (Acute Confusional State, Acute Organic Brain Syndrome)*

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**DELIRIUM** - **changed level of consciousness** + **clouding of consciousness** (confusion) → **inability to maintain attention**\* → **global change in cognition**.

\*main difference from dementia.

Lot. *delirare* – “išeiti iš vėžių”.

DELIRIUM TREMENS – see p. Psy21 >>

**LEVEL of consciousness (wakefulness-alertness-arousal)** - maintained by **ARAS** (upper brainstem RF, thalamus).

- **diminished level of consciousness (DROWSINESS, STUPOR, COMA)** results from depression of both cerebral hemispheres or ARAS. see p. S30 >>

**CONTENT of consciousness (awareness-thinking)** - depends on integrated and organized thoughts, subjective experiences, emotions, and mental processes, each of which resides (to some extent) in anatomically defined **cerebral cortex** regions.

- **clouding of consciousness (CONFUSION)** - is behavioral state of reduced mental clarity (inability to maintain coherent sequence of thoughts).  
N.B. confusion is disorder of content of consciousness.
- *inattention* and *disorientation* are main early signs.
- as acute confusional state worsens there is *global change in cognition* (deterioration in memory, perception, comprehension, problem solving, language, praxis, visuospatial function, various aspects of emotional behavior).

**ENCEPHALOPATHY** = confusion + element of drowsiness.

Delirium is **toxic / metabolic encephalopathy!**

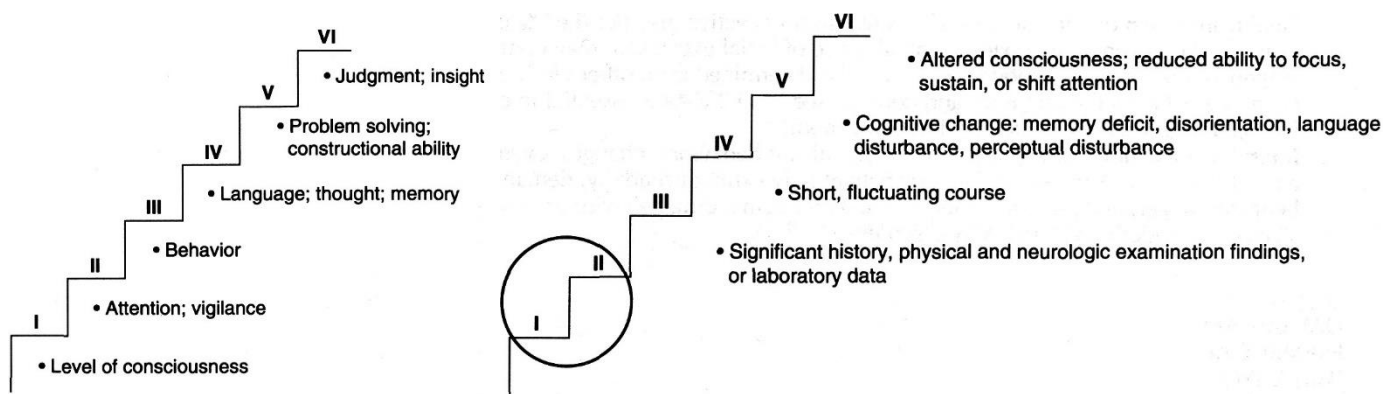
**Organic brain syndrome** - **global cognitive impairment states** whose unifying and defining feature is **CONFUSION**:

acute organic brain syndrome = DELIRIUM  
chronic organic brain syndrome = DEMENTIA

- organic brain syndromes are secondary to CNS disease, systemic disorders, or substance-related disorders.
- DSM-IV no longer classifies delirium & dementia as "organic" mental disorders that erroneously imply that other (primary) mental disorders are nonorganic.
- if delirium is *superimposed on preexisting dementia*, it is considered associated feature of dementia, not separate diagnosis.

Levels of mental status:

DELIRIUM (circle shows primary area of dysfunction):



- 10-15% patients admitted to acute care hospitals have delirium!

## ETIOLOGY

- delirium is **direct physiological consequence (nonspecific CNS manifestation) of ACUTE disorder with diffuse effect on brain:**
  - a) **brain disorders** (head injury, stroke, ICP $\uparrow$ , infection, epilepsy).
    - delirium occurs in 80% patients *at end of life*.
  - b) **medical systemic illness** (respiratory failure, fever, MI or heart failure, hepatic, renal, endocrine, metabolic disorders, infections!!!).
    - *diabetes mellitus* is most common metabolic cause!
    - *immobilization* and *immobilizing devices* (e.g. indwelling bladder catheters, physical restraints) are important factors in precipitating delirium!
  - c) **substance intoxication** or **substance withdrawal** (alcohol, drugs)
    - *psychoactive drugs* (esp. with *anticholinergic* or *sedative-hypnotic* properties) in standard adult dosages are particularly common causes of drug-induced delirium in elderly! (risk increases directly with number of drugs prescribed).
    - diagnosis of “substance-induced delirium” should not be made unless symptoms exceed those that would be expected during typical intoxication or withdrawal.

Almost any severe acute medical / surgical condition can cause delirium!

- **environmental factors** (unfamiliar surroundings, sleep deprivation, deranged schedule, frequent room changes, sensory overload / sensory deprivation) may aggravate delirium in hospital.
- in patients with **predisposing (vulnerability) factors**, even **relatively benign insult** (such as single dose of sleeping medication) may cause delirium; predisposing (vulnerability) factors:
  - 1) preexisting **dementia** (2-5-fold increased risk for delirium)
  - 2) **advanced age** (geriatric / degenerative cerebral cell loss, concomitant diseases  $\rightarrow$  more vulnerable brains)

Relatively mild systemic illness (esp. in combination with new medications, fever, sleep deprivation) may produce delirium in **elderly / demented** patient!  
Delirium is more common herald of onset of physical illness in elderly than fever, pain, and tachycardia!
  - 3) severe underlying illness, high levels of comorbidity, functional impairment
  - 4) chronic renal insufficiency
  - 5) dehydration, malnutrition
  - 6) vision or hearing impairment

## CLINICAL FEATURES

- develops over short period of time (hours ÷ days).
- fluctuates during day course! (often worsening at night – “sundowning”)
- main features: inattention & disorientation (time > place > person\*) → difficulty with memory and all mental activities\*\* (distinction from dementia depends simply on **acute nature** of condition).

**Disturbance in attention** is central to diagnosis of *DELIRIUM*! (indicated by inability to repeat five digits forward or recitation of months backward)

disproportionate (!) difficulty with immediate recall (e.g. of list of three items) suggests *DEPRESSION*, while difficulty with recalling items 5 min later suggests *DEMENCIA*

Delirium may be present in patient who is **completely oriented to person, place, and time** ("mental status examination" that solely assesses orientation may not detect delirium!).

\*only in the most severe cases person is unable to identify self!

\*\*to establish diagnosis (of delirium or dementia), physician must show that there has been *decline from patient's baseline cognitive functioning*.

- associated features: *patient's behavior is unpredictable!*
  - 1) **sleep-wake cycle** disruption / reversion
  - 2) level of consciousness is ↓ or ↑ - drowsy-**somnolent** or restless-**agitated** (HYPOACTIVE or HYPERACTIVE delirium).
  - 3) irritability, **emotional lability**
  - 4) some **autonomic system abnormalities** (pulse, BP, temperature, perspiration, respiratory rate, etc) vs. dementia.
  - 5) **illusions** and **hallucinations** – *visual ± auditory* (vs. *only auditory* in acute psychosis).
  - 6) some **delusions** - *transient, poorly organized* (vs. *systematized* in acute psychosis).
- most pertinent sign of metabolic encephalopathy is **asterixis**.
- *language* is disorganized and rambling, even paraphasic + impaired comprehension (due to inattention) - may be mistaken for aphasia.
- *psychiatrists* use term “delirium” interchangeably with “confusion”; *neurologists* prefer to reserve it as description for agitated, hypersympathotonic, hallucinatory state most often due to alcohol / drug withdrawal or to hallucinogenic drugs.

Characteristic	DELIRIUM	ACUTE PSYCHOSIS
Vital signs	Abnormal (fever, tachycardia)	Normal
Prior psychiatric history	Uncommon	Common
Course	Rapid fluctuating	Stable
Involuntary activity	Possible asterixis, tremor	Absent
Orientation	Usually impaired	Occasionally impaired
Attention	Globally impaired	May be disorganized
Concentration	Globally impaired	Impaired
Hallucinations	Visual ± auditory	Primarily auditory
Delusions	Transient, poorly organized	Systematized
Speech	Pressured, slow, possible incoherent	Usually coherent

**DIAGNOSTIC EVALUATION**

- dictated by findings during history and physical examination.

**Evidence of drug ingestion** should be sought on examination!

First-line investigations: electrolytes, CBC, liver and thyroid function tests, ESR, toxicology screen, syphilis serology, blood cultures, urine culture, chest x-ray, ECG.

Additional investigations to consider: neuroimaging, CSF analysis, EEG, HIV antibody titer, cardiac enzymes, blood gases, autoantibody screen.

- **characteristic EEG changes** (accompany fluctuating state of awareness) - diffuse symmetric **slowing of background EEG rhythm** (5-7 cycles/sec; due to reduced cerebral metabolic activity)  $\pm$  triphasic waves (e.g. in hepatic or renal encephalopathy)
  - normal EEG is incompatible with severe delirium!
  - recovery from delirium is accompanied by EEG rhythm acceleration.
  - in delirium tremens, cerebral blood flow is normal rather than reduced - **low-voltage fast activity** predominates in EEG.
- any patient with *fever & cognitive dysfunction*, even without meningismus (esp. if immunocompromised), should have lumbar puncture in ED to **rule out meningitis!**

### DSM-IV DIAGNOSTIC CRITERIA

- Disturbance of **consciousness** (i.e. reduced clarity of awareness of environment) with reduced ability to focus, sustain, or shift attention.
- Change in **cognition** (e.g. memory deficit, disorientation, language disturbance) or development of **perceptual** disturbance (that is not better accounted for by preexisting, established, or evolving dementia).
- Disturbance develops **over short period** (hours  $\div$  days) and **fluctuates** during course of day.
- Evidence from history, physical examination, or laboratory findings indicates that disturbance is caused by **direct physiologic consequences of general medical condition**.

### CAM (CONFUSION ASSESSMENT METHOD) DIAGNOSTIC ALGORITHM

- diagnosis requires presence of features **1** and **2** and either **3** or **4**:

**Feature 1.** Acute onset and fluctuating course

**Feature 2.** Inattention

**Feature 3.** Disorganized thinking

**Feature 4.** Altered level of consciousness

### TREATMENT

General **supportive & symptomatic** measures + **treatment of underlying condition** (after elimination of cause, delirium is reversed, sometimes slowly)!

NONPHARMACOLOGIC APPROACHES should be used!

**Delirium is medical emergency** - disease or drug intoxication may be fatal if untreated (esp. in elderly patient)!

- successful delirium treatment eliminates much of this excess mortality.
- two best predictors of fatal outcome are **advanced age** and presence of **multiple physical diseases**.

Minimize disruptive influences of environment (to minimize confusion):

- 1) quiet, low but well-lighted room.
- 2) frequent reassurance and orientation (by relatives and personnel) with simple instructions and explanations, and frequent eye contact.
- 3) same staff in attendance.

- 4) *clocks* and *calendars* should be provided.
- 5) *eyeglasses* and *hearing aids* may reduce sensory deficits.
- 6) allow uninterrupted period for sleep at night!!!
- 7) nonpharmacologic approaches to relaxation (music, relaxation tapes, massage) can be highly effective!
- 8) minimize immobilizing equipment (e.g. bladder catheters)

Review medication list (incl. OTC); *psychoactive medications* should be discontinued (in elderly, these medications may cause psychoactive effects even at doses and measured drug levels that are within “therapeutic range”).

**AGITATED PATIENTS** (may interrupt needed medical therapies [e.g. intubation, intravenous lines] or may endanger safety of patient or other persons):

- a) **pharmacologic control** (end point should be awake but manageable patient):
  - **HALOPERIDOL is drug of choice** (0.5-1 mg IM - optimal duration of action; repeat q30 min until sedation is achieved) - lacks serious respiratory, cardiac, or other organ system effects!; may be combined with LORAZEPAM; taper dose in next few days as agitation resolves.
  - **DROPERIDOL** is preferable when both sedative and antiemetic properties are indicated.
  - **DIAZEPAM** should be avoided (oversedation → confusion↑, respiratory depression, long half-life, risk of drug accumulation), but benzodiazepines are drugs of choice for **withdrawal from alcohol or sedative hypnotics** where long half-life of action is desirable.
- b) **physical restraints** (not advisable) - increase agitation, have been associated with significant patient injuries and even death by asphyxiation.

## PROGNOSIS

- **mortality** 25-33%!
- delirium typically persists for  $\geq 30$  days.
- only 20% patients have complete resolution at 6-month follow-up.

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