



일년차가 알아야 할 급성인지장애

정 지 향

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신경학적 평가



- 의식상태의 평가 : Neuroanatomical Evaluation
"Where is the lesion?"
 - 의식상태 변화의 anatomical Localization
 - Lateralizing sign의 유무
- 의식변화의 원인 : Etiological Evaluation
"What is the reason?"

Agenda



- Mental status
- Cognition, Cognitive dysfunction & dementia
- Bedside Cognitive Evaluation
 - Attention
 - Memory
 - MMSE
 - Language

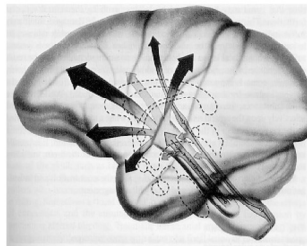
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ALERT, CONFUSION, ALTERED MENTAL STATUS

Alert

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- **Good Consciousness:** Awake & Aware



**Reticular
activating
system (RAS)**

+

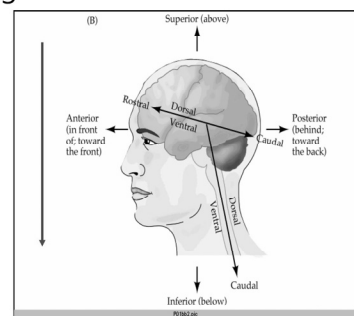
Cortical function

Altered Mental Status (AMS)

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- **Rostro-caudal Progression**

- Alert
- Somnolent
- Confusion(혼돈)**
- Lethargy
- Stupor(혼미)**
- Coma (혼수)**



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AMS – Laboratory work Up

- Hypoglycemia : <40 mg/dL
- Hyperglycemia : 350 mg/dL in DKA /
600 mg/dL in NKH
- Hyponatremia (acute onset) : 125 mEq/L
(if below 115 mmol/L, coma or seizure)
- Hyperosmolarity : 350 mosmol/L
- Hypocalcemia, ionized Ca below 2 mmol/L
- Hypomagnesemia: below 0.7mEq/L
- Metabolic (or lactic) acidosis : <pH 7.0

Important Rule-outs


- | | |
|-------------------------------|-----------------------------------|
| • Wernicke's | • Subdural hematoma |
| • Hypoxia | • Septicemia |
| • Hypoglycemia | • Subacute bacterial endocarditis |
| • Hypertensive encephalopathy | • Hepatic or renal failure |
| • Meningitis/encephalitis | • Thyrotoxicosis/myxedema |
| • Poisoning | • Delirium tremens |
| • Anticholinergic psychosis | • Complex partial seizures |

**ALERT, CONFUSION,
ACUTE CONFUSIONAL STATE**



Definition of Confusion

- Confusion :
 - Impaired attention and concentration,
 - manifest disorientation in time, place and person,
 - impersistent thinking, speech and performance,
 - reduced comprehension and capacity to reason
 - fluctuate in severity, typically worse at night
 - perceptual disturbances and misinterpret voices, common objects and actions of other persons



Delirium

- Disorganized thinking with reduced ability to maintain attention and to shift attention
- Synonyms: Peer-reviewed literature
 - ✓ **Acute confusional state**
 - ✓ Acute cognitive impairment
 - ✓ Acute (toxic or metabolic) encephalopathy
 - ✓ Acute mental status change
 - ✓ Altered mental status
 - ✓ Dysergastic reaction
 - ✓ Subacute befuddlement

Cognitive dysfunction

Acute/Subacute

VITAMINS

Chronic

Degenerative disease

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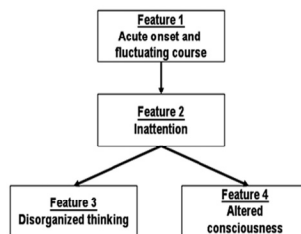
DSM V Criteria

- Disturbance in attention (reduced ability to direct, focus, sustain, and shift attention) and awareness.
- The disturbance develops over a short period of time (usually hours to days), represents a change from baseline, and tends to fluctuate during the course of the day.
- An additional disturbance in cognition (memory deficit, disorientation, language, visuospatial ability, or perception)
- The disturbances are not better explained by another preexisting, evolving or established neurocognitive disorder, and do not occur in the context of a severely reduced level of arousal, such as coma
- There is evidence from the history, physical examination, or laboratory findings that the disturbance is caused by a medical condition, substance intoxication or withdrawal, or medication side effect.



Confusion Assessment Method (CAM)

Sensitivity (94 to 100%), specificity (90 to 95%)



**Diagnosis of Delirium: requires presence
(1) features 1 and 2 and (2) either 3 or 4.



Clinical characteristics

- Develops acutely (hours to days)
- Characterized by fluctuating level of consciousness
- Reduced ability to maintain attention
- Agitation or hypersomnolence
- Extreme emotional lability

History

1. Previous intellectual function
2. Functional status (eg. Mobility, transfers, toileting/bathing, aids used)
3. Onset and course of confusion
4. Previous episodes of acute or chronic confusion
5. Sensory deficits – hearing, sight, speech
6. Symptoms suggestive of underlying cause(infection)
7. pre-admission social circumstances / care package
8. Full drug history including non-prescribed drugs
9. Alcohol history



Clinical characteristics: cognitive deficits

- Language difficulties:
 - word finding difficulties, dysgraphia
 - slurred, mumbling, incoherent or disorganized
 - **D/DX from Wernicke aphasia: consistent comprehension deficit**
- Memory dysfunction: marked short-term memory impairment, disorientation to person, place, time.
- Perceptions: misinterpretations, illusions, delusions and/or visual (more common) or auditory hallucinations
- Constructional ability: can't copy a pentagon

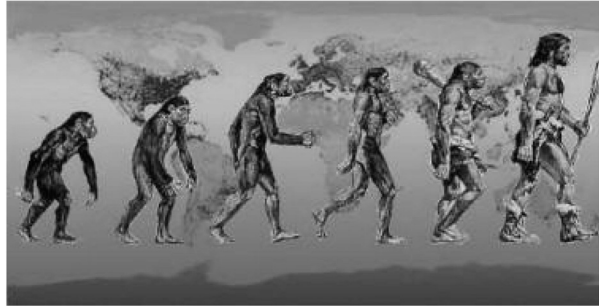
BEDSIDE COGNITIVE TESTING

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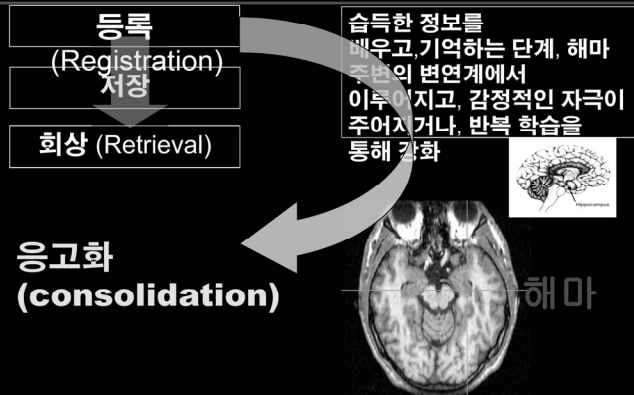
COGNITION

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판단능력 주의집중력 (전두엽기능)	시공간능력 시각적기억력 (우측 두정측두엽)	언어능력 언어적기억력 (좌측 측두엽)	도구사용능력 (좌측 두정엽)
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기억의 관문: 해마



Bedside Testing

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Orientation : Time, Place, Person

- Can be insulting to a patient to ask pointedly,
 - Often helpful to state:
 - “환자분의 상태를 모르기때문에 확인하기 위해 몇가지 사항에 대해 질문드리겠습니다.”
 - Person – naming & relationship
 - Place – recognize where they are
(at home, in an ambulance, at a hospital)
 - Time – day, date, month,
- For elderly : 계절, 하루 중 언제(아침, 점심, 저녁),
시간 (+/- 1시간)

Bedside Testing



Testing Attention -Concentration

- One of the most basic, but neglected areas of the mental status exam
- Affects all other areas of cognition
- Digit Span: 5 forwards, 4 backwards
- 20에서 1까지 거꾸로 말해보세요.
- 일요일부터 월요일까지 거꾸로 말해보세요
- 요일 중 월이라고 할 때만 박수를 한 번 치도록 지시 (두 개 이상 오류를 보인 경우 Abnormal)
- Serial 7's : 100에서 7을 빼나가 보세요.

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Bedside Testing



Memory

- 1) Primary memory (immediate recall)
 - stored in reticular activating system
 - tested by serial repetition (digits, 3 items)
- 2) Secondary (recent) memory
 - stored in the limbic system,
 - tested by 3 objects in 3 minutes 비행기연필소나무 (그가 내 뒤를 몰래 밟았다/칼날같이 날카로운 바위)
- 3) Tertiary memory (remote events)
 - stored in the association areas of cortex,
 - tested by asking about verifiable remote events

Examination



1. Age (exact only)
2. Date of birth (date and month)
3. Time (to nearest hour)
4. Year (exact only)
5. Name of hospital
6. 3 Items recall of MMSE
7. Recognition of 2 persons (의료진, 가족)
8. Date of event (올림픽, 6.25전쟁)
9. Name of present president
10. Count backwards 20-1

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Bedside Testing

Language

1. 스스로 말하기 : 7 음절이상
 1. 이름이 어떻게 되세요?
 2. 여기가 어딘가요?
 3. 어디가 불편해서 오셨나요?
2. 이해하기
 1. 눈을 감아보세요.
 2. 왼손으로 오른쪽 귀를 만져보세요
3. 이름대기
 1. 단어빈도 높은것: 연필, 시계, 안경,
 2. 단어빈도 낮은것: 형광등, 청진기,
4. 따라 말하기: 다람쥐, 돌아온 철새, 창밖에 부슬부슬 비가 온다
5. 쓰기 / 읽기 : 본인이 쓴 글을 읽게 한다

Acute/subacute cognitive decline (VITAMINS)

Vascular	infarct (multi-infarct, thalamic etc)/Hemorrhage
Infectious-	Encephalitis, UTI, pneumonia, PML
Toxic-metabolic	Alcohol/수면제/저혈당/고혈당/간기능,신장기능이상/ 전해질불균형
Autoimmune disease	Anti-NMDA paraneoplastic, CNS vasculitis
Metastasis	뇌종양/부종양증후군(paraneoplastic)
Iatrogenic	Restraints/Urinary catheter/Sleep deprivation/Untreated pain/Surgery/ 약물
Neurodegenerative	Creutzfeldt-Jacob Disease
Systemic	Hypertensive encephalopathy

Acute/subacute cognitive decline (Drugs)

- 항콜린성약물
- 삼환계 항우울증 약물
- Benzodiazepine 계열
- 항히스타민
- 간질약
- 근육이완제
- Dopamine 항진제
- Beta 차단제
- 수면제
- Opiates
- Digitalis
- NSAIDS
- Steroids

Types of delirium

Hyperactive	Mixed	Hypoactive
<ul style="list-style-type: none"> restless agitated hyper-vigilant hallucination delusion 	<ul style="list-style-type: none"> Hyperactive + hypoactive 	<ul style="list-style-type: none"> lethargic drowsy sedative respond slowly to questions hardly move spontaneously

≥4 hypoactive symptoms : hypoactive type

≥3 hyperactive symptoms : hyperactive type

➤ The most common types are hypoactive and mixed accounting for approximately 80% of delirium cases

Predisposing risk factors

- >60 years of age
- Male sex
- Visual impairment
- Underlying brain pathology such as stroke, tumor, vasculitis, trauma, dementia
- Major medical illness
- Recent major surgery

- Depression
- Functional dependence
- Dehydration
- Substance abuse/dependence
- Hip fx
- Metabolic abnormalities
- Polypharmacy

Etiology:

It is multifactorial

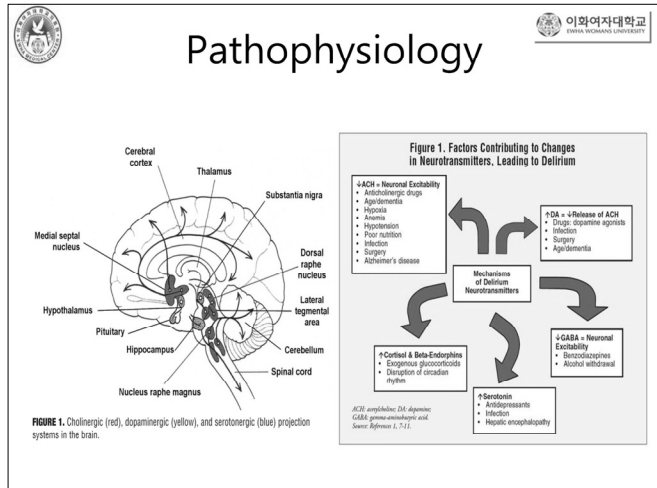
Systemic illness
Medications
Presence of RF

Figure 1. Causes and Interactions of Pain, Agitation, and Delirium.

Drugs and other treatments for pain, agitation, and delirium form an "ICU triad" cognitive management analogous to the "triad of anesthesia," which highlights interactions among hypnotics, analgesics, and muscle relaxants to encourage balanced anesthesia. The "ICU triad" concept highlights that changing one element is unlikely to be as effective as a coordinated approach.

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Delirium – work Up


- **Vitals:** normal range of BP, HR, Temp and pain
- **Good physical exam:** particular emphasis on Cardiac, pulmonary and neurologic systems
- **Hydration status**
- **Also rule out**
 - fecal impaction
 - urinary retention
 - Infected pressure ulcer, UTI or pneumonia

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Delirium – Laboratory work Up

- CBC, electrolytes, glucose, LFT, BUN/Cr
 - glucose, CO₂, Ca⁺, Mg, TSH, B12, albumin
 - B1, if in suspect
- Selected additional testing:
 - drug levels, toxic screen
 - ABGA, EKG
 - Carboxy Hb
 - Sepsis work-up; Infection workup (Urinalysis, CXR) +/- blood cultures
- Role for Brain imaging/Lumbar puncture/EEG:
 - new focal symptoms, high suspicion, no other possible diagnosis






Treatment

- Always **non-pharmacological interventions** in your **Care Plan**.
 - Initiate toileting routines
 - Mobilize ASAP
 - Quiet room, soothing music
 - Educate caregiver
 - Vision/Hearing

(그림 설명의 자료)




▶ 신속한 화장실 유지해 주는 것입니다.

▶ 환자에게 조별의 남매의 상황을 알려주어서 환자가 혼란을 막아주도록 해 줍니다.


▶ 적당 수준의 자극을 유지해야 합니다.

환자를 환상시키기 위해 약물치료를 할 수도 있습니다.

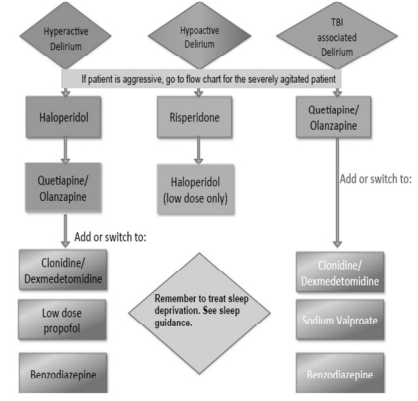



Treatment-meds

- Antipsychotics- IM/IV Haldol is first line (less than 3 mg)
 - Always R/O Delirium Tremens
 - Significantly reduced risk of Extrapyramidal side effects.
 - Onset of action within 5-20 minutes.
- Some data now supports use of atypical antipsychotics
 - Risperdal 0.5-2mg,
 - Quetiapine 12.5-50mg,
 - Olanzapine 2.5-10mg.



Pharmacological management of delirium:





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Management of sleep:이화여자대학교
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Non-pharmacological interventions:

- Minimise nighttime sleep disruptions and white noise
- Maintenance of the homeostatic sleep-wake cycle.
- Elimination of unnecessary noise and light
- Consolidation of patient care interactions
- Non-pharmacologic sleep aids such as earplugs, eye masks and relaxation techniques (eg. calming music and massage)
- Temperature control of environment – not too cold
- Make sure no stimulants are consumed after 16.00, such as caffeine

Assess and manage pain and anxiety



Trazodone

Melatonin

Melatonin

Zopiclone

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Take home message이화여자대학교
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- confusion & delirium vs wernicke aphasia
 - Orientation, Attention,
 - short-term memory,
 - language function
- Behavior management: case by case