神經系統與心智功能常見問題之評估:

3. 意識不清(confuse)

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意識(Consciousness): Awareness of self & surroundings

1.喚醒Arousal(awakefulness): Ascending RAS →Thalamus

(RAS:Reticular Activating System) ↓

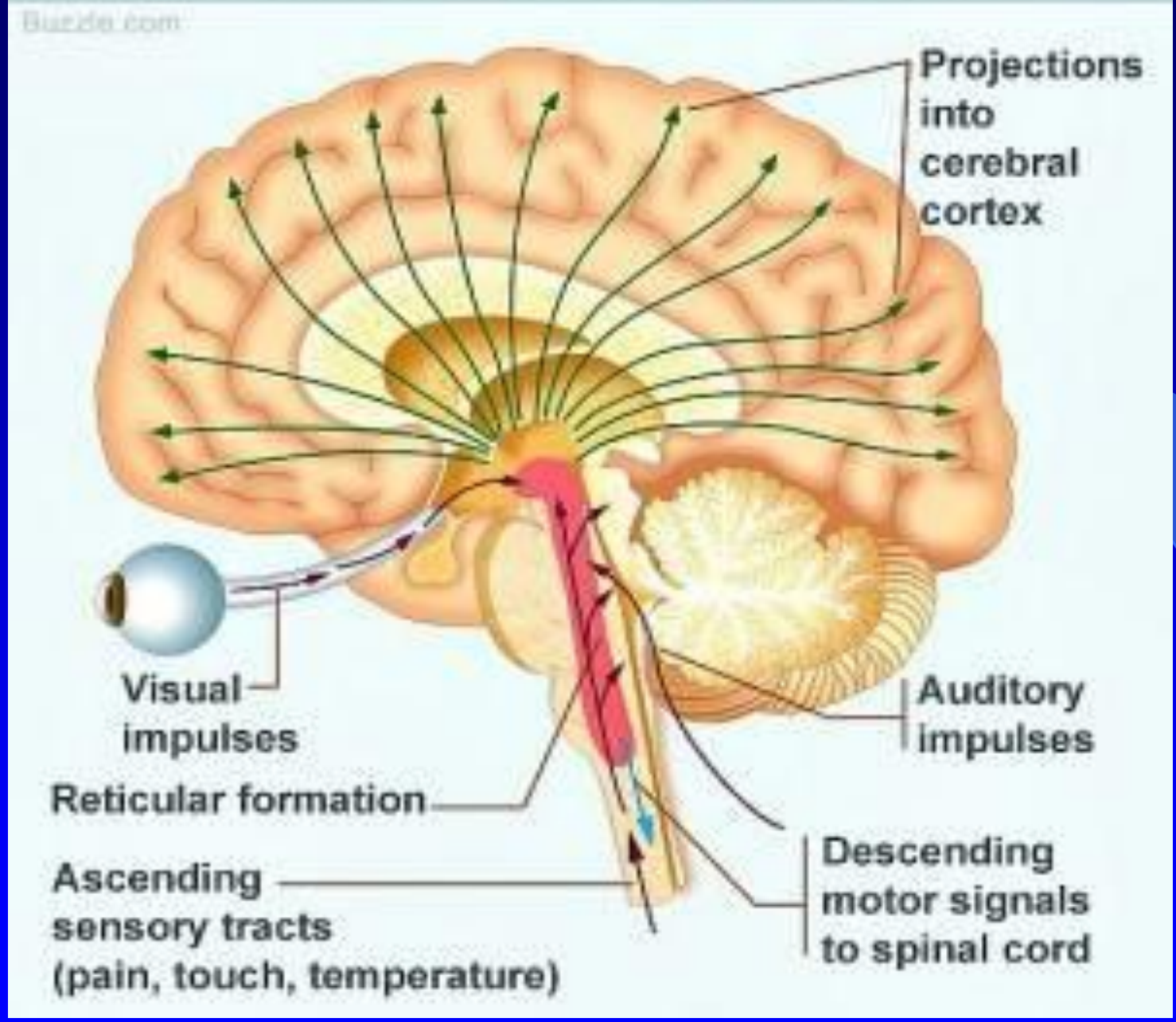
2.知道Awareness(Alertness): Bil. Cerebral hemisphere

Clear → Confuse → Drowsy→ Stupor→ Coma

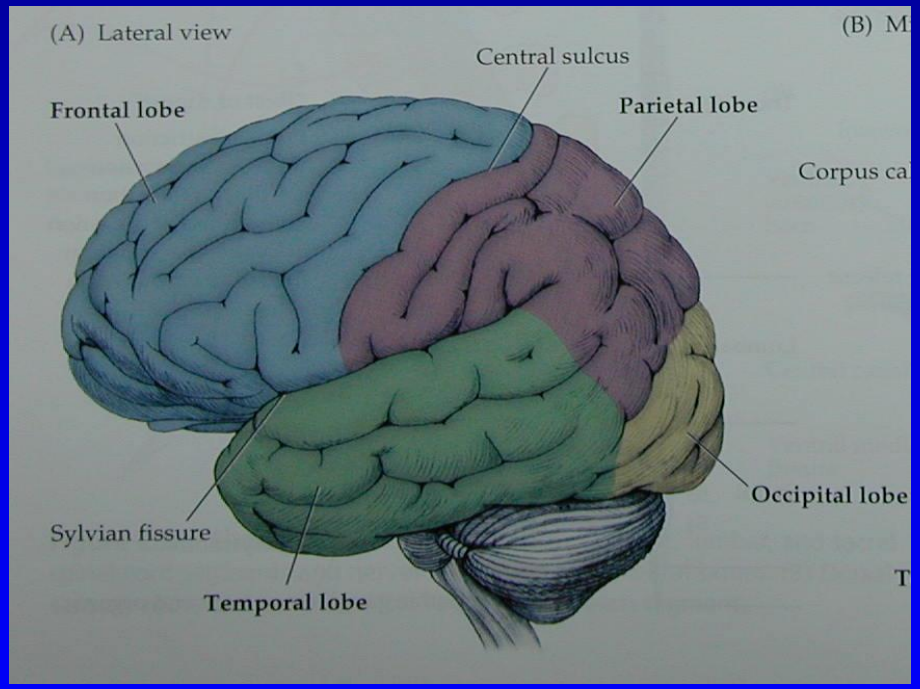
Confuse: Inattention

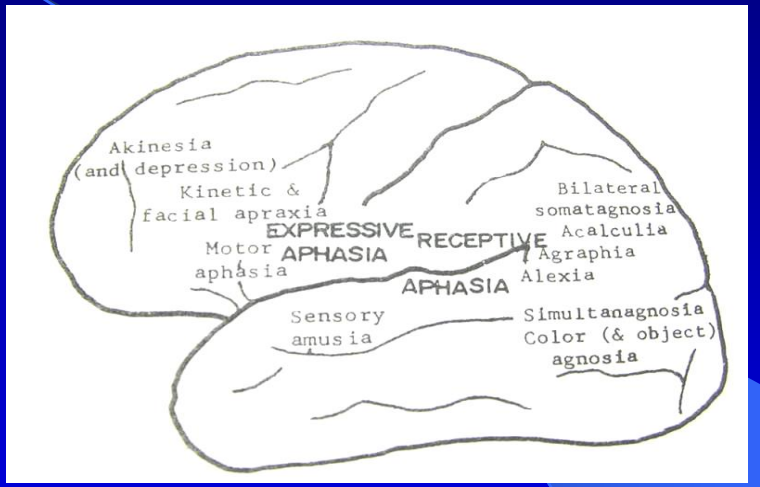
Delirium: A confusional state with excessive sympathetic activity or psychotic picture(visual hallucination)

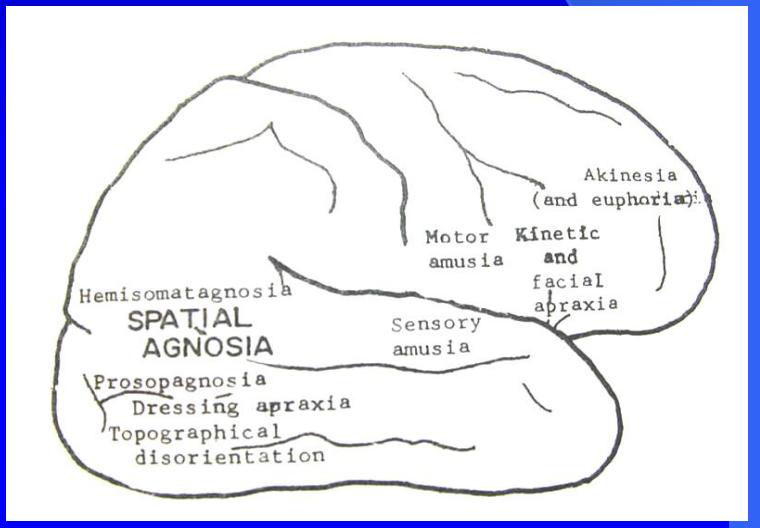
Reticular Activating System



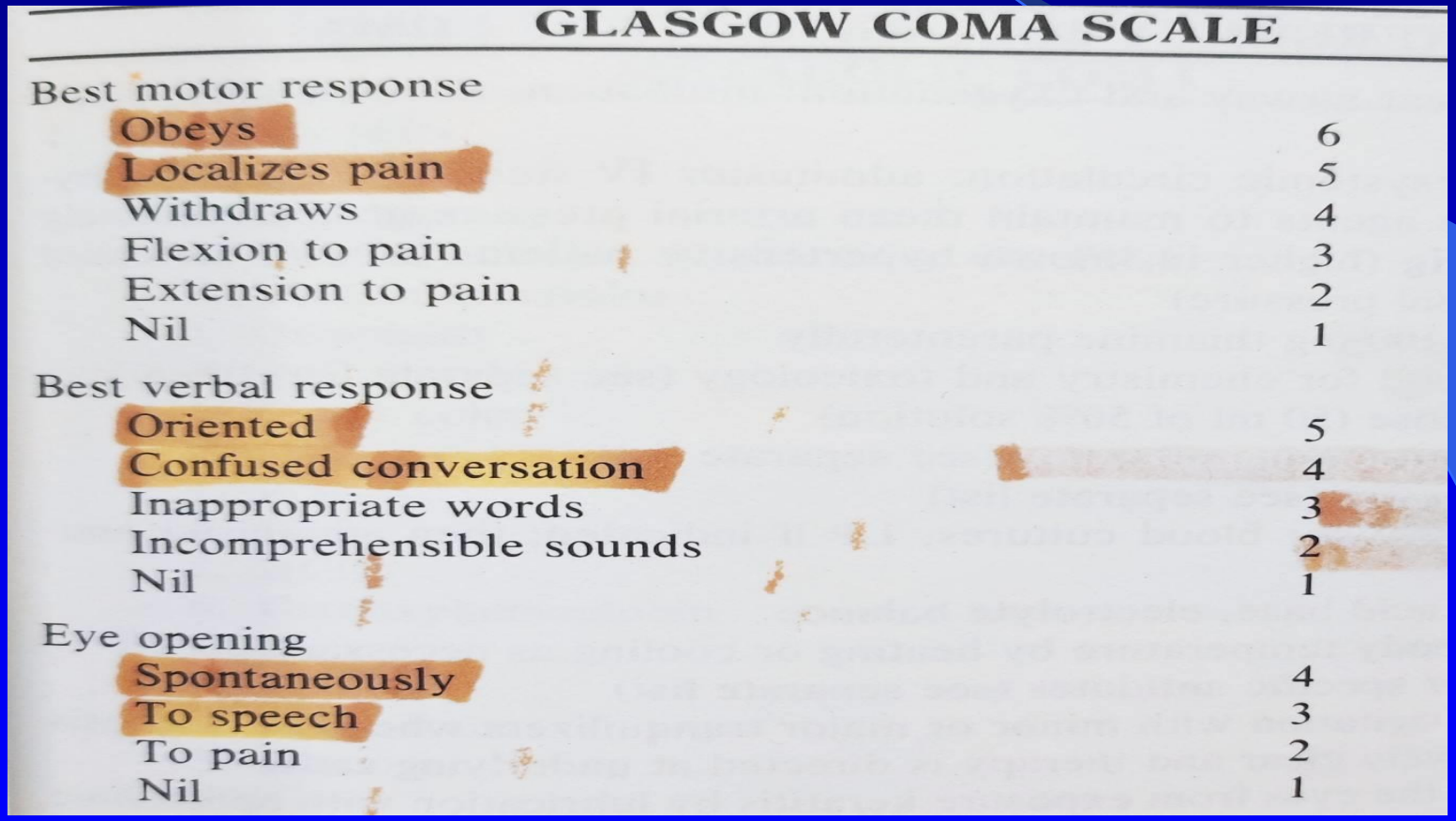
大腦的功能


(A) Lateral view
(B) M
Central sulcus
Frontal lobe
Parietal lobe
Corpus ca
Occipital lobe
Sylvian fissure
Temporal lobe
T


Akinesia
(and depression)
Kinetic &
facial apraxia
EXPRESSIVE
APHASIA
Motor
aphasia
RECEPTIVE
APHASIA
Bilateral
somatagnosia
Acalculia
Agraphia
Alexia
Sensory
amusia
Simultanagnosia
Color (& object)
agnosia

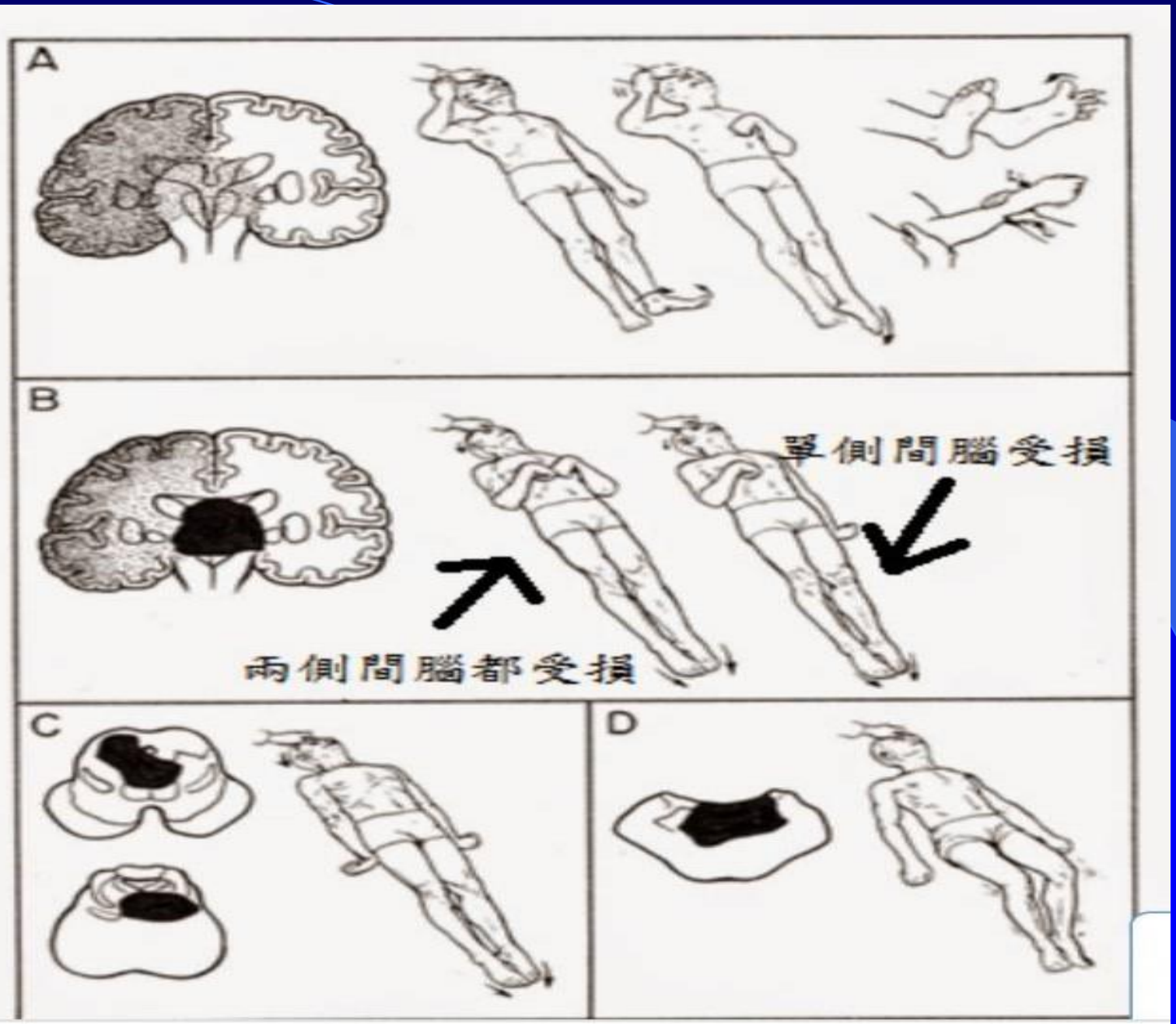

Akinesia
(and euphoria)
Motor
amusia
Kinetic
and
facial
apraxia
Hemisomatagnosia
SPATIAL
AGNOSIA
Sensory
amusia
Prosopagnosia
Dressing apraxia
Topographical
disorientation

Glasgow coma scale 昏迷指數



GLASGOW COMA SCALE	
Best motor response	
Obeys	6
Localizes pain	5
Withdraws	4
Flexion to pain	3
Extension to pain	2
Nil	1
Best verbal response	
Oriented	5
Confused conversation	4
Inappropriate words	3
Incomprehensible sounds	2
Nil	1
Eye opening	
Spontaneously	4
To speech	3
To pain	2
Nil	1

M6 :可遵照指示動作。（譬如要他舉手，就會舉手）得6分
M5 :神智尚可知道痛在何處。（捏他，他手會來揮開你的手）得5分
M4 :對痛的刺激只有退縮反應。（捏他，他只會手彎起來，像胎兒）得4分
M3 :大腦皮質功能喪失。對刺激都是兩腳僵硬打直，兩手向上扭曲。得3分
M2 :大腦、中腦都功能喪失。對刺激都是兩腳僵硬打直，兩手向下扭曲。得2分
M1 :什麼反應都沒有。得1分


A
B
單側間腦受損
兩側間腦都受損
C
D

Cognitive functions(JOMAC)

1.判斷力(Judgement)

2.定向力(Orientation): to person, place, time

3.記憶(Memory):Encoding, storage, and retrieval of information

4.抽象思考(Abstract thinking): 滾石不生苔

5.計算力(Calculation): 100-7= -7= -7= -7= -7=

6.執行力(Executive): Planning, decision-making, problem-solving, and goal-setting

7.感知(Perception): Interpretation of sensory information (Visual & auditory hallucination)

8. **語言(Language):**流利(Fluent) ,複誦(Repetition),理解 (Comprehension),命名(Naming)

[幾乎所有慣用右手的人,語言中樞在左腦; 慣用左手的人,語言中樞只有七成左右在左腦,語言中樞在右腦的佔了約15%;左右兩邊都有語言中樞的佔了約15%]

Focal neurologic sign	Meningeal sign	
A. NO	NO	A: Global encephalopathy Metabolic derangement Anoxic,hypoperfusion state Sepsis Drug overdose Post-ictal state
B. YES/NO	YES	B: SAH Meningitis Meningoencephitis
C. YES	NO	C: Brain tumor or abscess Cerebral infarction ICH

意識改變 AEIOUTIPS

- 酒精 Alcohol
- 酸血症 Acidosis
- 肝性腦病變 Ammonia
- 心律不整 Arrhythmia
- 電解質 Electrolyte
- 腦病變 Encephalopathy
- 內分泌 Endocrine

意識改變 AEIOUTIPS

- 感染 Infection
- 低血氧 Oxygen
- 藥物過量 Overdose
- 鴉片類藥物 Opiates
- 呼吸衰竭 CO2 retention
- 一氧化碳 CO intoxication
- 尿毒症 Uremia

意識改變 AEIOUTIPS

- 外傷 Trauma
- 體溫 Temperature
- 血糖 Insulin - 低血糖
- 血糖 Insulin - DKA/HHS
- 毒物 Poison
- 精神問題 Psychiatry

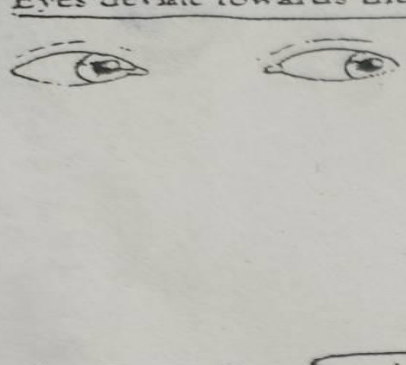
意識改變 AEIOUTIPS

- 腦部病灶 Space occupying
- 腦出血 SAH, SDH
- 中風 Stroke
- 癲癇 Seizure
- 暈厥 Syncope

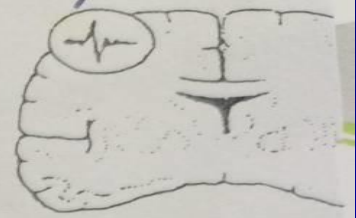
Occurring during a seizure

Eyes deviate towards the affected limbs in a jerking fashion.

定位 Eye-limb



Indicates an epileptic focus in the frontal lobe contralateral to the direction of eye deviation. →



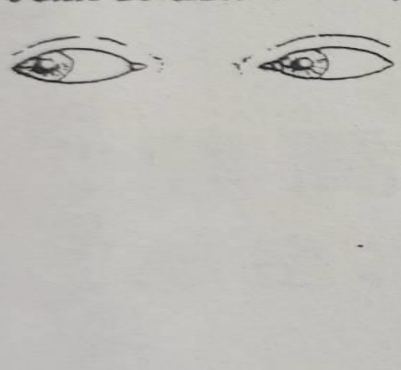
seizure

limb convulsion

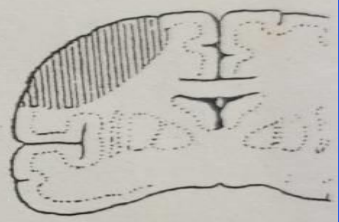
Accompanying a hemiparesis

Tonic deviation of the eyes *away* from the hemiparetic limb

Eye-cortex



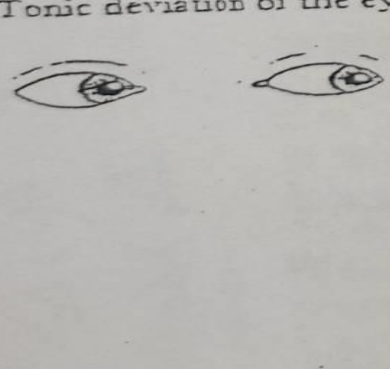
Indicates a lesion in the frontal lobe *ipsilateral* to the direction of eye deviation. →



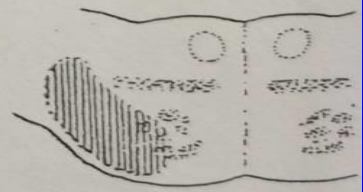
stroke

Tonic deviation of the eyes *inwards* the hemiparetic limb.

Eye-limb



Indicates a lesion in the pons *contralateral* to the direction of eye deviation. →



pons

AEIOU TIPS

AEIOU TIPS mnemonic helps recall causes of altered mental status:

- A - alcohol, acidosis
- E - epilepsy, encephalopathy
- I - insulin
- O - overdose
- U - uremia

- T - tumor, trauma
- I - infection
- P - psychiatric, poisoning
- S - seizure, sepsis, shock, stroke

Delirium

A. Disturbance **in attention & awareness**.

B. Develops over hours to days, represents **acute change** from baseline, & tends to fluctuate in severity during the course of a day.

C. Additional disturbance in **cognition** (e.g., memory, orientation, language, visuospatial ability, or perception).

D. **Evidence** (Hx, exam or lab findings) that disturbance is due to another medical condition, substance intoxication or withdrawal, or exposure to a toxin, or to multiple etiologies.

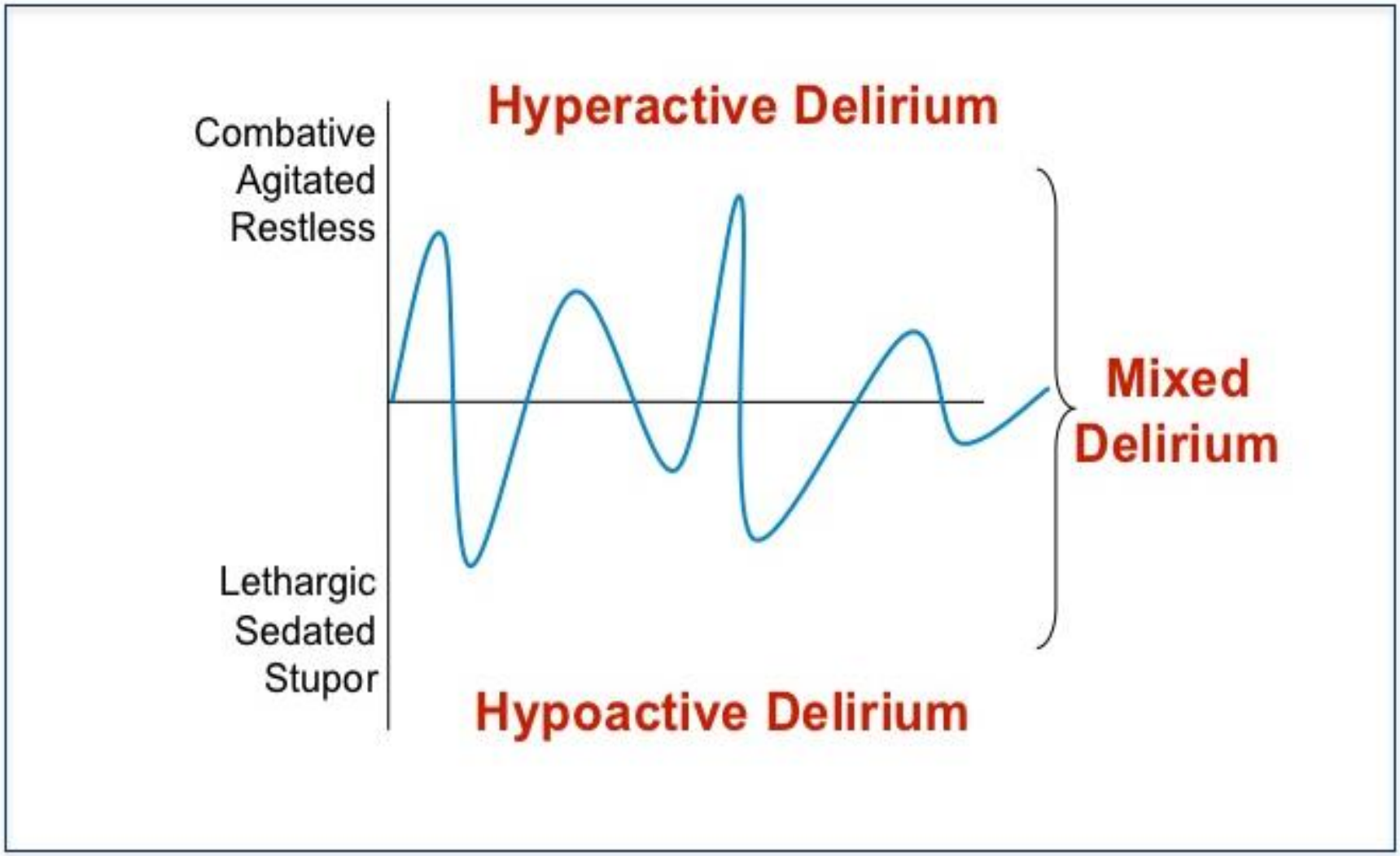
Mechanism

- Pathophysiology largely uncharacterized.
- ↑ **GABAergic & dopaminergic activity** &/or central **cholinergic deficiency**
- Management is empirical.

Predisposing factors of Delirium

Validated Predisposing Factors	
Dementia	Comorbidity or severity of illness
Cognitive impairment	Depression
History of delirium	History of transient ischemia or stroke
Functional impairment	Alcohol misuse
Visual impairment	Older age (≥75 yr)
Hearing impairment	
Validated Precipitating Factors	
Drugs (see below)	Infection
Use of physical restraints	Trauma admission
Use of bladder catheter	Surgery (especially aortic aneurysm repair; noncardiac thoracic; neurosurgery)
Increased serum urea or increased BUN:creatinine ratio	Urgent admission
Abnormal serum albumin	Coma
Abnormal sodium, glucose, or potassium	Metabolic acidosis

Delirium Subtypes



Presentation

- Most common inpatient **behavioral** disorder (30% elderly medical pts, 10%–50% elderly surgical pts, up to **80%** of ICU patients).
- Two main forms: Hypoactive & agitated
  - **Hypoactive**: Inattention, disordered thinking, & ↓ level of consciousness.
  - **Agitated**: ↑ vigilance, psychomotor & autonomic overactivity; agitation, excitement, tremulousness, hallucinations, delusions.

Present/Past Hx.

- **Difference** from baseline functioning, prior episodes of delirium
- Hx of **dementia**(**risk factor**)
- Risk factors/predisposing conditions or **meds**,
- Recent febrile illness, & history of EtOH/**drug** abuse.

General examination

- Vital signs, dehydration
- infectious foci, e/o COPD, hepatic failure, renal failure, needle tracks-IV drug, or cherry red lips (e/o CO poisoning).
- Breath: Alcohol, fetor hepaticus, uremic fetor, or ketones.
- Bitten tongue and/or fx/dislocation of shoulder (r/o seizure).
- Autonomic sign/symptom (tachycardia, sweating, flushing, dilated pupils).

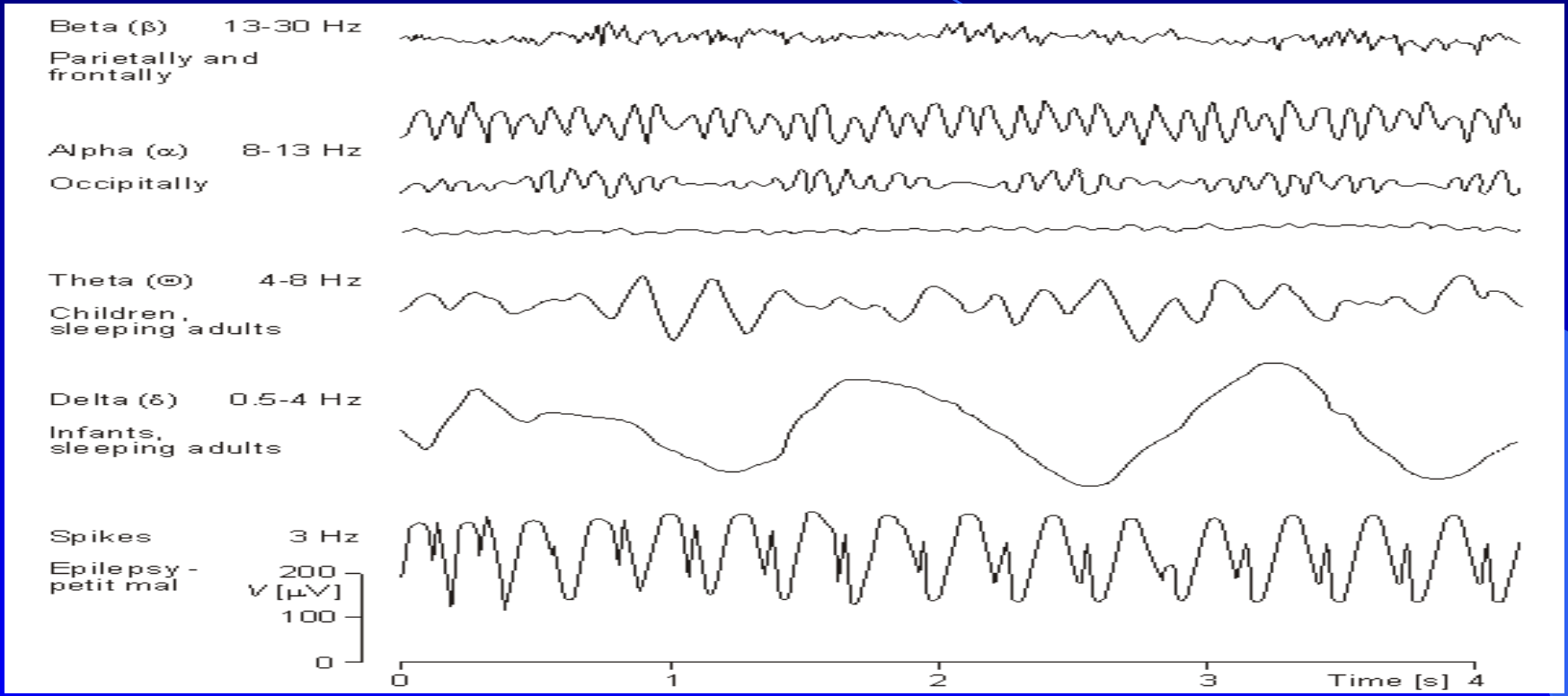
Neurologic examination

- Level of consciousness & attention.
- Look for focal signs, multifocal myoclonus & postural tremor.
- Ophthalmoplegia, ataxia,and confusion raises possibility of Wernicke encephalopathy (Thiamine deficiency)

Laboratorial testing

- Na, K, BUN, Cr, CO2, glucose, Ca, Mg, CBC, UA
- LFT, NH3, ESR, CRP, TSH/free T4, UA, RPR, TSH, CXR, toxin screen (blood, urine), B12, homocysteine, thiamine
- ABG (respiratory alkalosis in early sepsis, hepatic failure; metabolic acidosis (uremia, DKA, lactic acidosis, late phases of sepsis); poisoning with salicylates, methanol, & ethylene glycol).
- LP: In any febrile confused patient with meningismus; Older pts with bacterial meningitis can be delirium rather than fever, meningismus.
- **Neuroimaging before LP** if: obtunded, focal sign/symptom, papilledema, suspect ↑ ICP

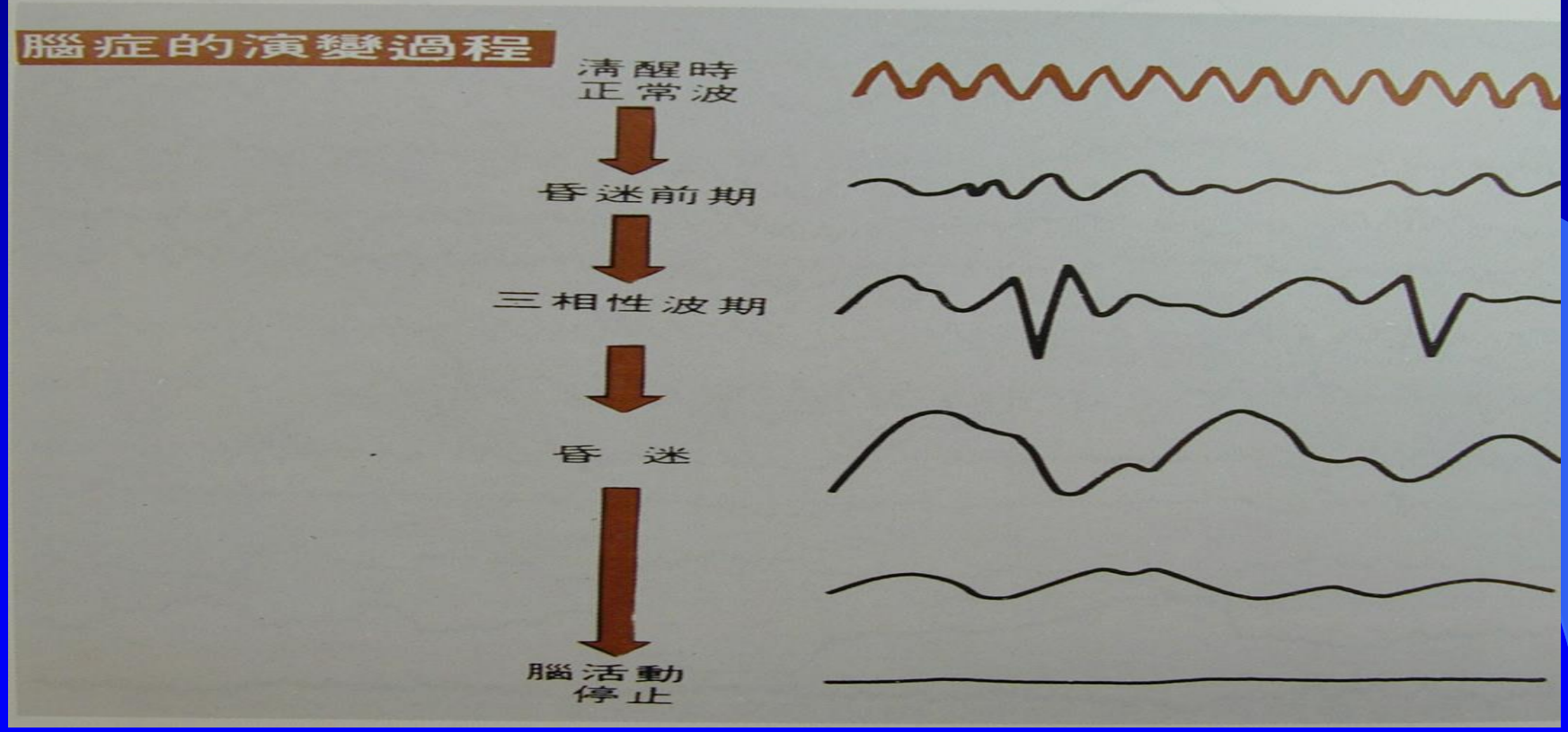
EEG


Beta (β) 13-30 Hz
Parietally and frontally
Alpha (α) 8-13 Hz
Occipitally
Theta (ϖ) 4-8 Hz
Children, sleeping adults
Delta (δ) 0.5-4 Hz
Infants, sleeping adults
Spikes 3 Hz
Epilepsy - petit mal
200
V [μV]
100
0
0
1
2
3
Time [s] 4

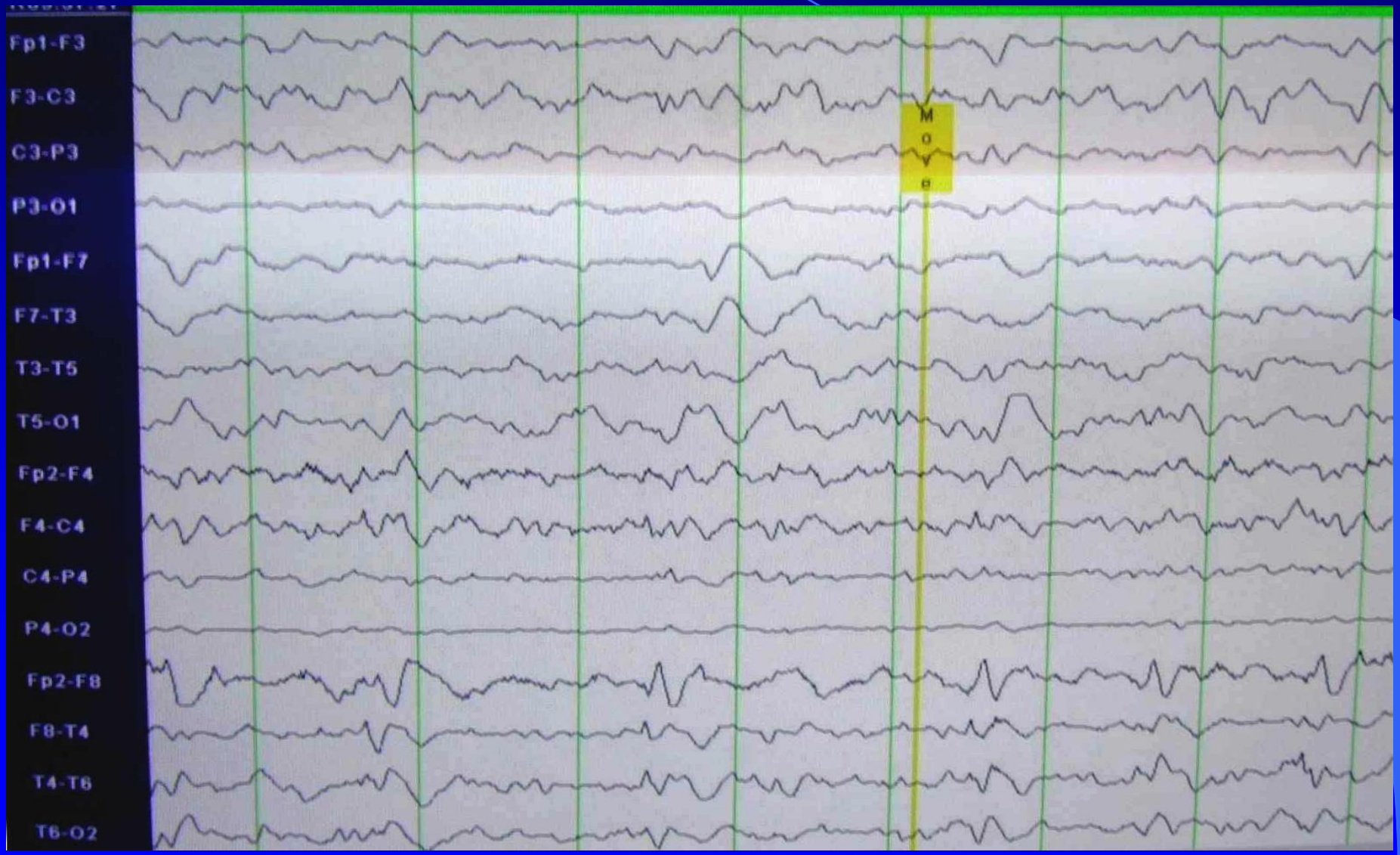
EEG

- Exclude **seizures**, esp NCSE/subclinical seizures.
- Triphasic waves with diffuse background slowing in metabolic encephalopathies (hepatic/uremia encephalopathy)
- PLEDs (Periodic Lateralized Epileptiform Discharges) over temporal leads in HSV encephalitis

Ⅸ—4. 代謝異常 i. 腦症 (Encephalopathy)



Right temporal PLED



Management of Delirium

- Clinical trials for delirium management have focused mainly on **antipsychotic** or **sedating** drugs to reduce agitation & behavioral symptoms.
- Growing evidence suggests that antipsychotics & sedatives may prolong duration & associated **cognitive** impairments.

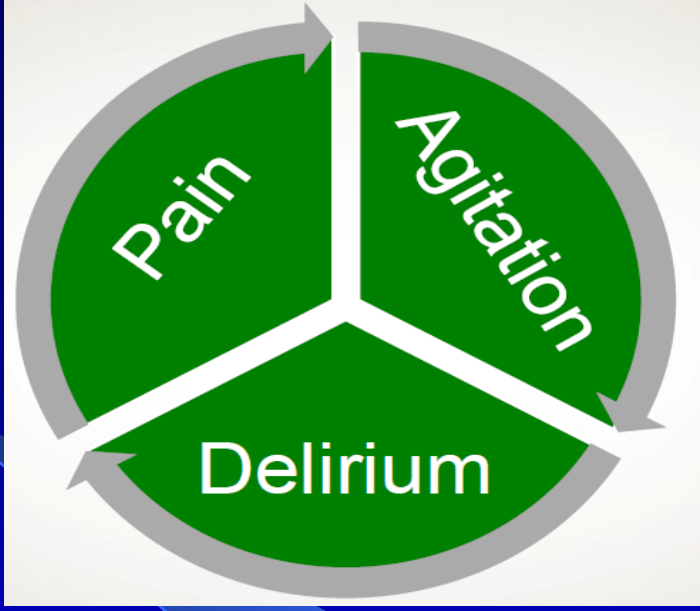
Management of Delirium

- Main approaches
  - Avoid/remove aggravating factors;
  - Identify & treat causes;
  - Cognitive rehabilitation;
  - Drug reduction, drug-sparing approaches (i.e., substitution for less toxic alternatives);
  - Sleep enhancement (e.g., melatonin);
  - Reduction of pain & stress (including complementary & alternative medicine).

Prevention interventions

- Orientation protocols, cognitive stimulation activities, frequent reassurance, touch, verbal orientation from familiar persons.
- Environmental modification & nonpharmacologic sleep aids for insomnia.
- Minimize ambient noise, provide good lighting (e.g., windows).
- Early mobilization, minimizing use of restraints.
- Visual aids (e.g., glasses) & hearing aids.
- Early volume repletion for pts with dehydration.
- Pain management protocols (reduce severity/duration).
- Treat incontinence (present in >50% delirious pts).
- Avoid if possible: Changes of environment (e.g., room changes), physical restraints, constipation, anticholinergic drugs, urinary catheters.

Delirium & pain



- Complex relationship:
  pain, agitation & delirium
- Undertreated pain → agitation & confusion, but opioid use → delirium.
- "Crescendo pain" may represent a form of delirium.
- Meperidine-Demerol in older pts often exacerbates delirium.

Managing behaviors

- Hyperactive delirium (agitation, combative behavior); risk for falls, wandering off, removing tubes & IV lines: may need physical or chemical restraints.

- **Chemical** restraints (psychotropic medications): **Low-dose haloperidol** can reduce severity & duration of episodes. Newer atypical antipsychotic with fewer extrapyramidal side effects, similar efficacy (quetiapine, risperidone, olanzapine).
- **Benzodiazepam** (lorazepam 0.5–1.0 mg): Onset rapid (~5 min if given IV)
- **Physical** restraints: Last resort: ↑ agitation, ↓ mobility, cause pressure ulcers, ↑ aspiration risk, prolong delirium.

Pharmacologic Management of Delirium (*Nat Rev Neurol* 2009;5:210)			
	Dose	**Adverse Effects**	**Comments**
Prophylactic Therapies			
Antipsychotics			
Haloperidol (Haldol)	0.5–1.0 mg PO bid	EPS, ↑ QTc	RCTs show ↓ sx severity, duration
Atypical Antipsychotics			
Risperidone (Risperdal) Olanzapine (Zyprexa) Quetiapine (Seroquel)	0.5 mg bid 2.5–5 mg qd 12.5–25 mg bid	EPS, ↑ QTc	Similar efficacy to Haldol. May ↑ mortality in demented pts—avoid long-term use
Benzodiazepines: *Only for delirium 2/2 EtOH & opiate withdrawal*			
Lorazepam (Ativan)	0.5–1 mg PO q4h prn	Paradoxical excitation, resp. depression, sedation, confusion	Not shown to improve delirium; use limited by adverse effects
Cholinesterase Inhibitors			
Donepezil (Aricept)	5 mg qd	n/v, diarrhea	Case reports; no RCTs
Agitation PRN Therapy			
Antipsychotics			
Haloperidol	0.5–10 mg PO (young/healthy pts); 0.25–2.0 mg PO in elderly & frail	EPS, ↑ QTc	May ↓ delirium incidence. Avoid IV route if possible (short acting). IM/IV 2x potency of PO [1 mg PO equivalent to 0.5 mg IM/IV]