APPROACH TO ALTERED MENTAL STATUS IN THE EMERGENCY

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WHAT IS ALTERED MENTAL STATUS ?
LETHARGY/OBTUNDATION/STUPOR/COMA

- Level of arousal (Global/diffuse) vs Content of thought (Focal ie involvement of one class of stimuli)

- Objective scores have replaced archaic terms

- Sleep is the only physiologic form of reduced consciousness

- Ref: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

THE THREE MAIN MECHANISMS ARE:

1. STRUCTURAL BRAIN LESIONS
2. DIFFUSE NEURONAL DYSFUNCTION SECONDARY TO SYSTEMIC PATHOLOGY
3. RARELY PSYCHIATRIC CAUSES

Neurological	Metabolic	Diffuse physiological brain dysfunction	Psychiatric
Ischaemic stroke	Hypoglycaemia	Seizures – including nonconvulsive status epilepticus	Psychiatric coma
Intracerebral haemorrhage	Hyperglycaemia	Alcohol intoxication	Malingering
Subarachnoid haemorrhage	Hyponatraemia	Opioid toxicity	
Subdural haematoma	Hypernatraemia	Drug overdose	
Brain tumour	Hypercalcaemia	Poisoning	
Cerebral lymphoma	Addisonian crisis	Hypothermia	
Multiple brain metastases	Hypothyroidism	Neuroleptic malignant syndrome	
Central nervous system infection	Uraemia	Serotonin syndrome	
Cerebral abscess	Hypercapnia		
Cerebral oedema	Septic encephalopathy		
Hydrocephalus	Hepatic encephalopathy		
Anoxic brain injury (eg post cardiac arrest)			
Posterior reversible encephalopathy syndrome (PRES)			
Trauma			

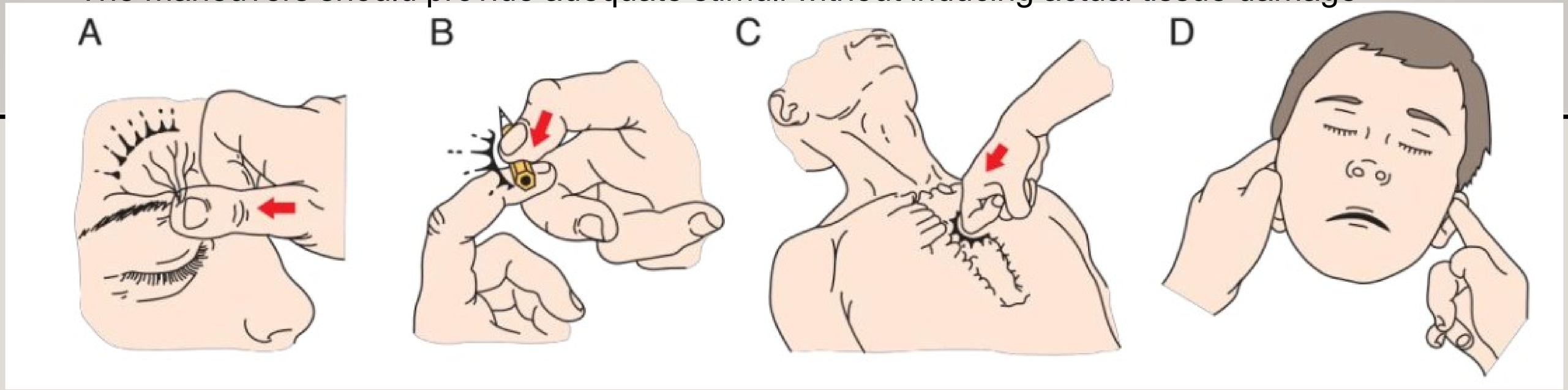
Epidemiology

- The most prevalent etiology of non traumatic coma is ischemic or hemorrhagic stroke (6 to 54%)
- Anoxic injury (3 to 42%)
- Poisoning (1 to 39%)
- Metabolic (1 to 29%)

Non-structural causes tended to slightly out number the structural causes (37-75% vs 28-64%)

SCALES AND MEASURES: LEVEL OF CONSCIOUSNESS

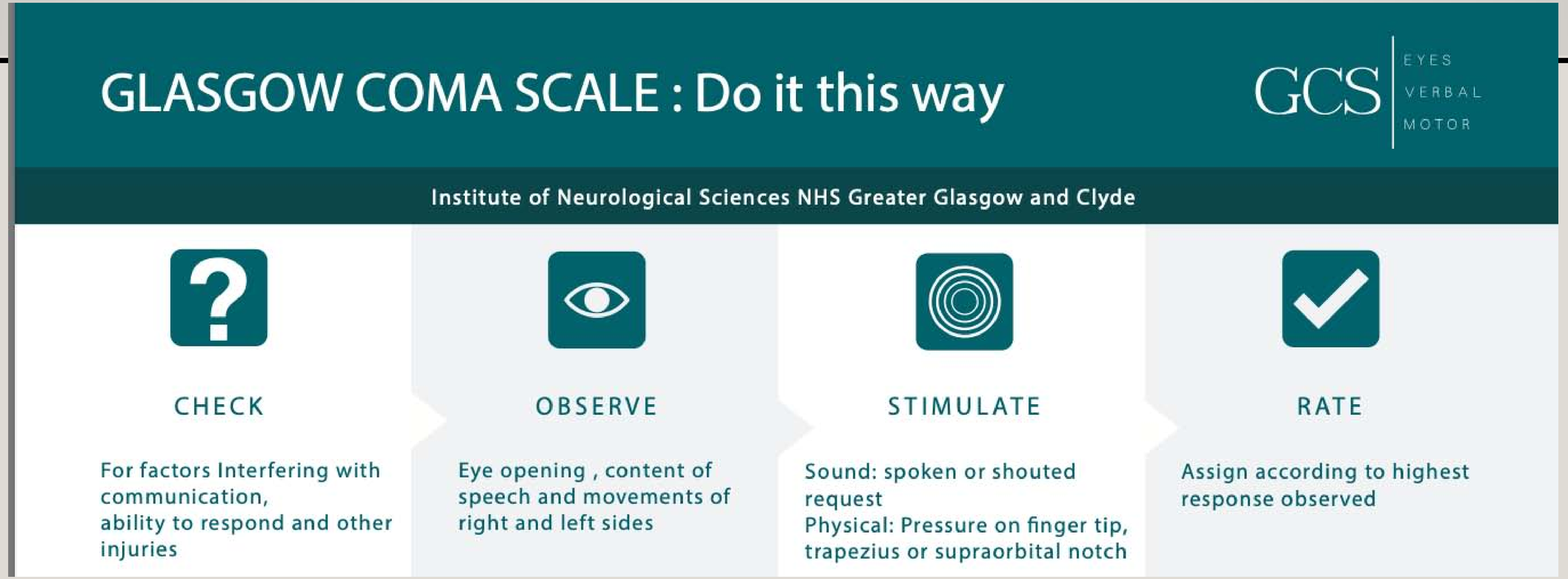
The maneuvers should provide adequate stimuli without inducing actual tissue damage



- Glasgow Coma Scale - Scale or Score ? -Use the best score
- FOUR Score - Full Outline of UnResponsiveness
- AVPU - Awake Verbal Pain Unresponsive
- ACDU - Alert Confused Drowsy Unresponsive

- Ref: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

GCS



Ref: (c) Sir Graham Teasdale 2015 Retrieved from : https://www.glasgowcomascale.org/downloads/GCS-Assessment-Aid-English.pdf?v=3

THE GLASGOW COMA SCALE

Eye opening	Movement	Verbal
4 – Spontaneous	6 – Obeys commands	5 – Oriented
3 – To speech	5 – Localises to pain	4 – Confused
2 – To pain	4 – Withdraws from pain	3 – Inappropriate words
1 – None	3 – Abnormal flexion to pain	2 – Incomprehensible sounds
	2 – Extensor response to pain	1 – None
	1 – No response	

FOUR SCORE

Eye Response

- 4 = eyelids open or opened, tracking, or blinking to command
- 3 = eyelids open but not tracking
- 2 = eyelids closed but open to a loud voice
- 1 = eyelids closed but open to pain
- 0 = eyelids remain closed with pain

Brainstem Reflexes

- 4 = pupil and corneal reflexes present
- 3 = one pupil wide and fixed
- 2 = pupil or corneal reflexes absent
- 1 = pupil and corneal reflexes absent
- 0 = absent pupil, corneal, and cough reflex

Motor Response

- 4 = thumbs-up, fist, or peace sign
- 3 = localizing to pain
- 2 = flexion response to pain
- 1 = extension response to pain
- 0 = no response to pain or generalized myoclonic status

Respiration

- 4 = not intubated, regular breathing pattern
- 3 = not intubated, Cheyne-Stokes breathing pattern
- 2 = not intubated, irregular breathing
- 1 = breaths above the ventilator rate
- 0 = breaths at ventilator rate or below

FOUR SCORE

- Incorporates Brainstem reflexes
- No verbal component
- Good Interobserver agreement
- Is it time to shift ? - Evidence practice mismatch

Ref : Vivek N. Iyer, Jayawant N. Mandrekar, Richard D. Danielson, et al Validity of the FOUR Score Coma Scale in the Medical Intensive Care Unit,Mayo Clinic Proceedings,Volume 84, Issue 8,2009,Pages 694-701,ISSN 0025-6196, https://doi.org/10.4065/84.8.694.

WHEN IN DOUBT : JUST DESCRIBE IT.

HISTORY

Attempt to Solicit and record history that includes :

- Time and acuity of onset, fluctuations, evolution
- Associated symptoms - a. Headache/fever/seizures/nausea vomiting
  b. Motor activity changes c. Speech changes in content and pattern
- Past history : similar events, Chronic neurologic deficits, HIV status,
- Family history : including neurologic, endocrinological
- Current medication - Dose, recent alterations in medicine or in its dosage
- Social history - alcohol and drug abuse

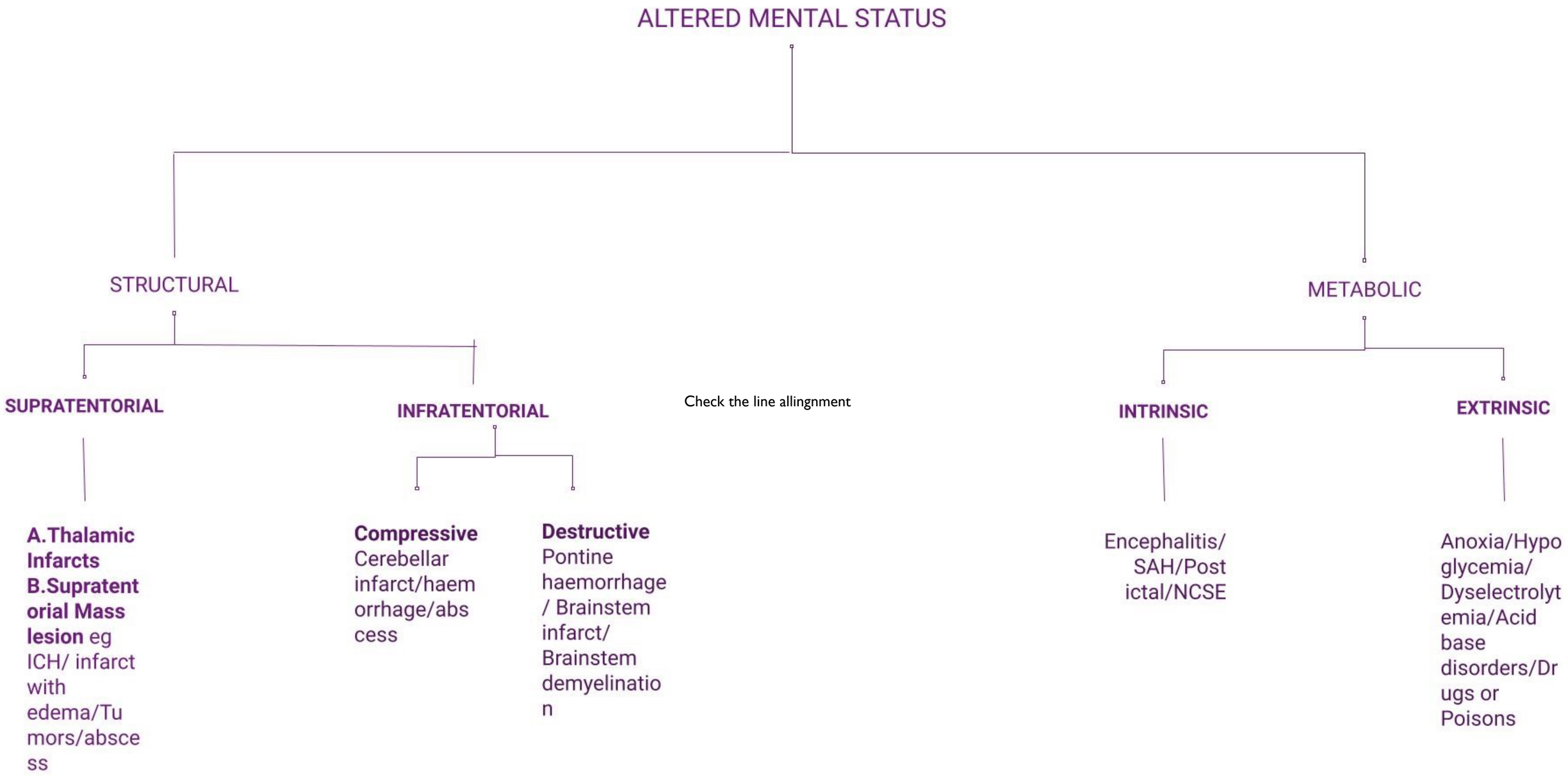
Ref : American College of Emergency Physicians: Clinical policy for the initial approach to patients presenting with altered mental status. Ann Emerg Med February 1999;33:251-281

NEUROLOGICAL EXAMINATION CHECKLIST

It’s brief . Fortunately.

- ~~What we don’t want to miss :~~
- Level of consciousness
- Pupillary responses
- Oculomotor responses
- Motor : Tone/Reflexes/Responses
- Pattern of breathing
- Fundus
- Meningeal signs - ?LP

Ref : American College of Emergency Physicians: Clinical policy for the initial approach to patients presenting with altered mental status. Ann Emerg Med February 1999;33:251-281



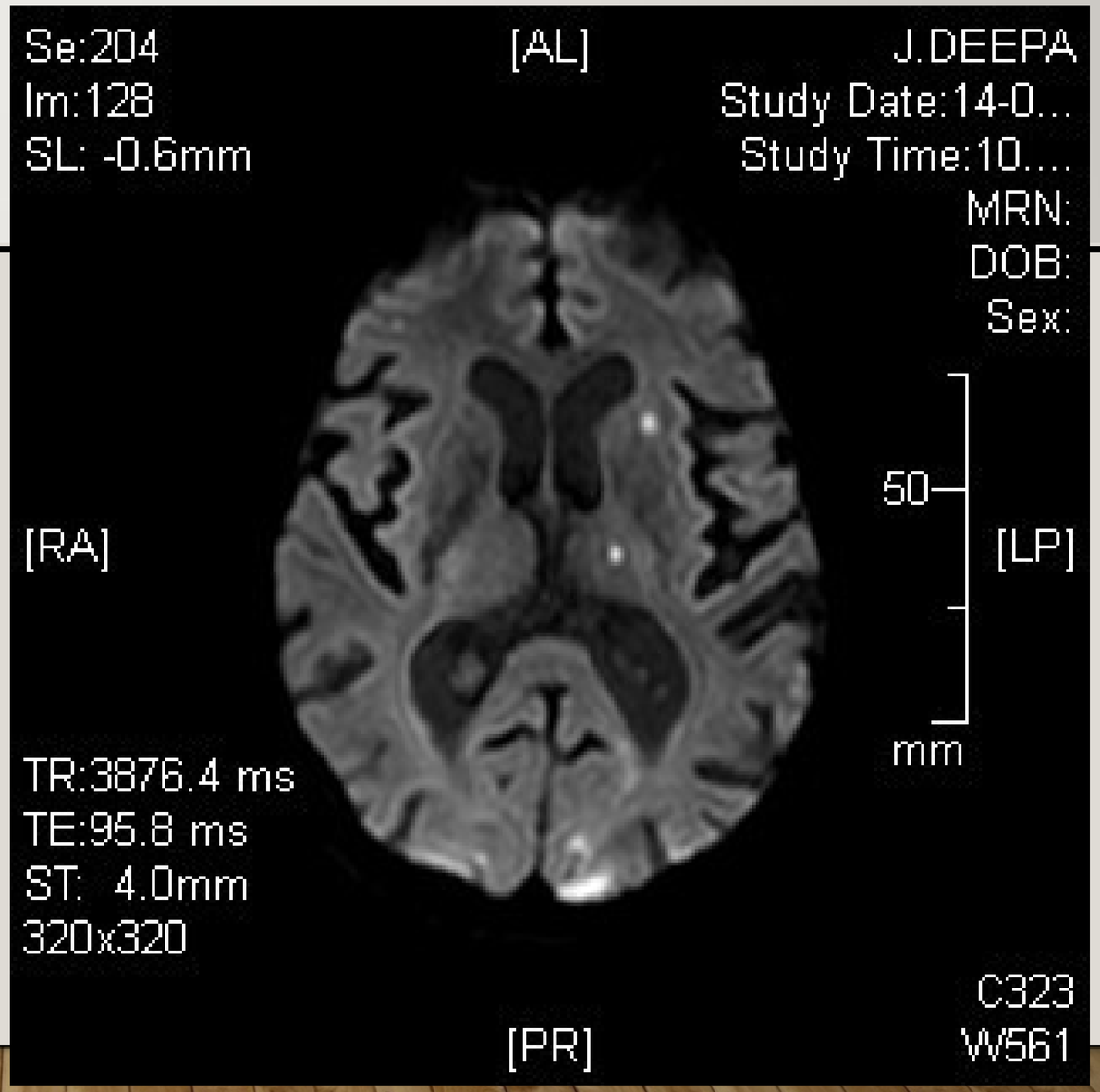
Check the line allingnment

- Adapted From: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

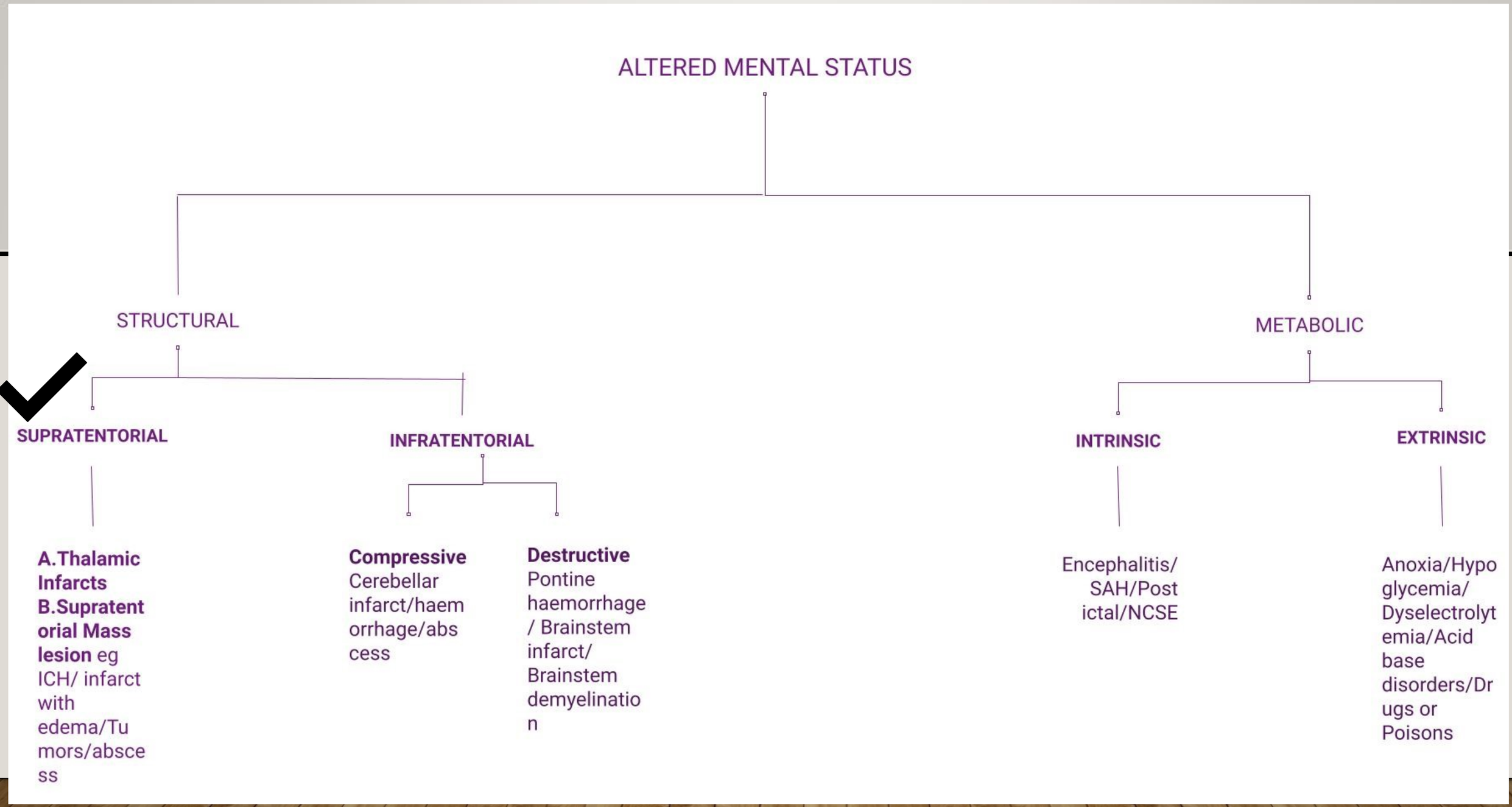
Clinical Vignette 1:

- 84 y, F Acute onset drowsiness for 18h
- O/E : E2V1M5
- Gaze preference to the left
- Moving all 4 limbs to pain
- NCCT Head : Acute infarct in left posterior temporal and occipital
- Does this explain M5 status ?

- Unilateral hemispheric lesion will not cause a reduced level of consciousness.
- MRI revealed left thalamic infarct
- Stupor or coma at onset in thalamic stroke occurred in 62% IVH vs 6% infarcts vs ICH 13% *



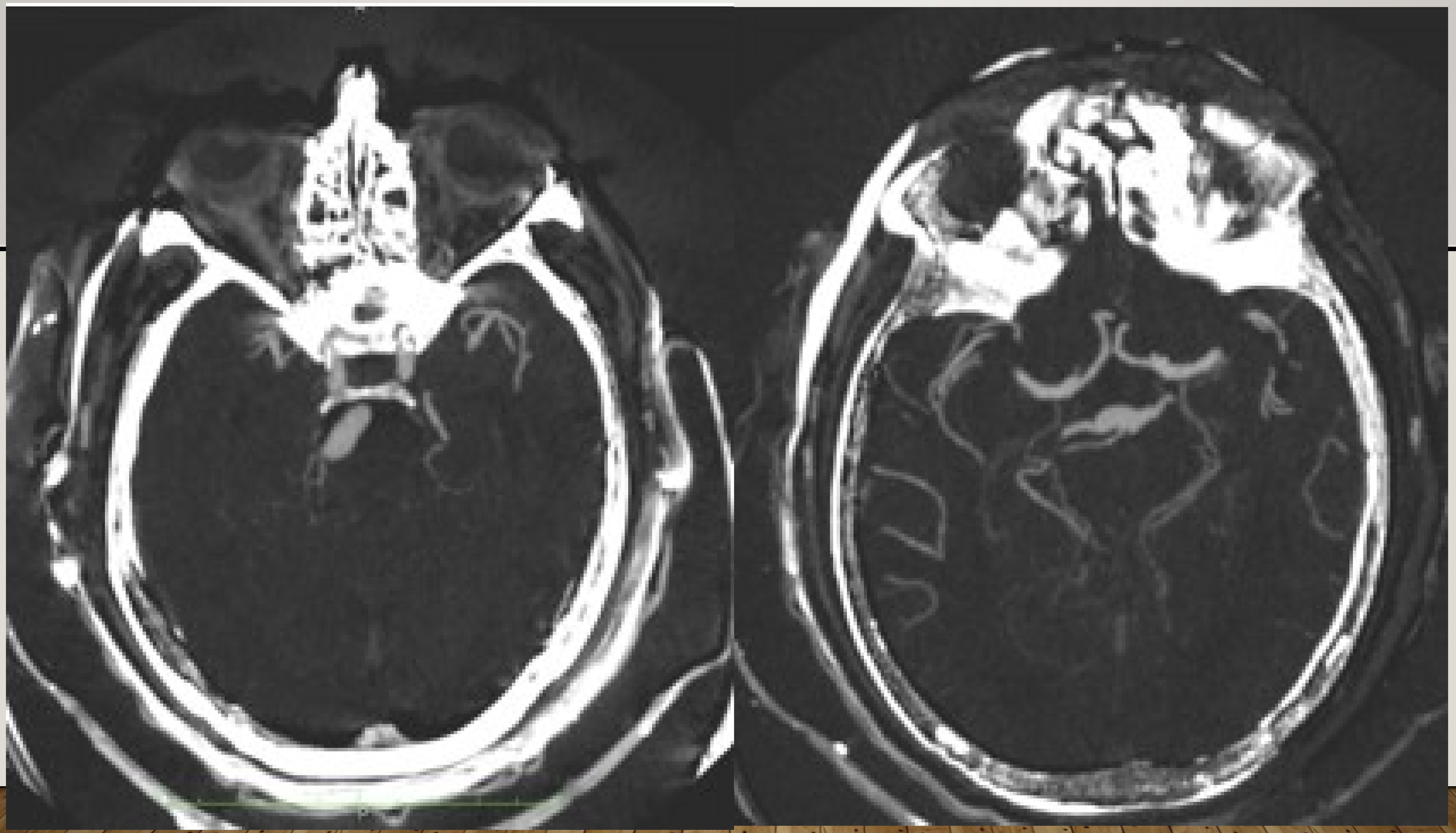
* Ref : Steinke W, Sacco RL, Mohr JP, et al. Thalamic Stroke: Presentation and Prognosis of Infarcts and Hemorrhages. *Arch Neurol.* 1992;49(7):703–710. doi:10.1001/archneur.1992.00530310045011



- Adapted From: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

Clinical Vignette 2 :

- A 58 year, M
- Hypertension for 20 years
- presented with sudden loss of consciousness and fall in the bathroom, followed by confusion and quadriparesis
- O/E E3V4M6(drowsy)
- Pupils - mid-dilated, sluggishly reactive to light on the right
- Tone raised in all 4 limbs.
- B/L Plantar extensor, All DTR exaggerated.
- Fundoscopy - Normal



- NCCT head : Hypodense lesion on the right side of Midbrain extending into the Thalamus with mass effect.

- CTAngiography : Vertebrobasilar Dolichoectasia

PUPILS IN AMS

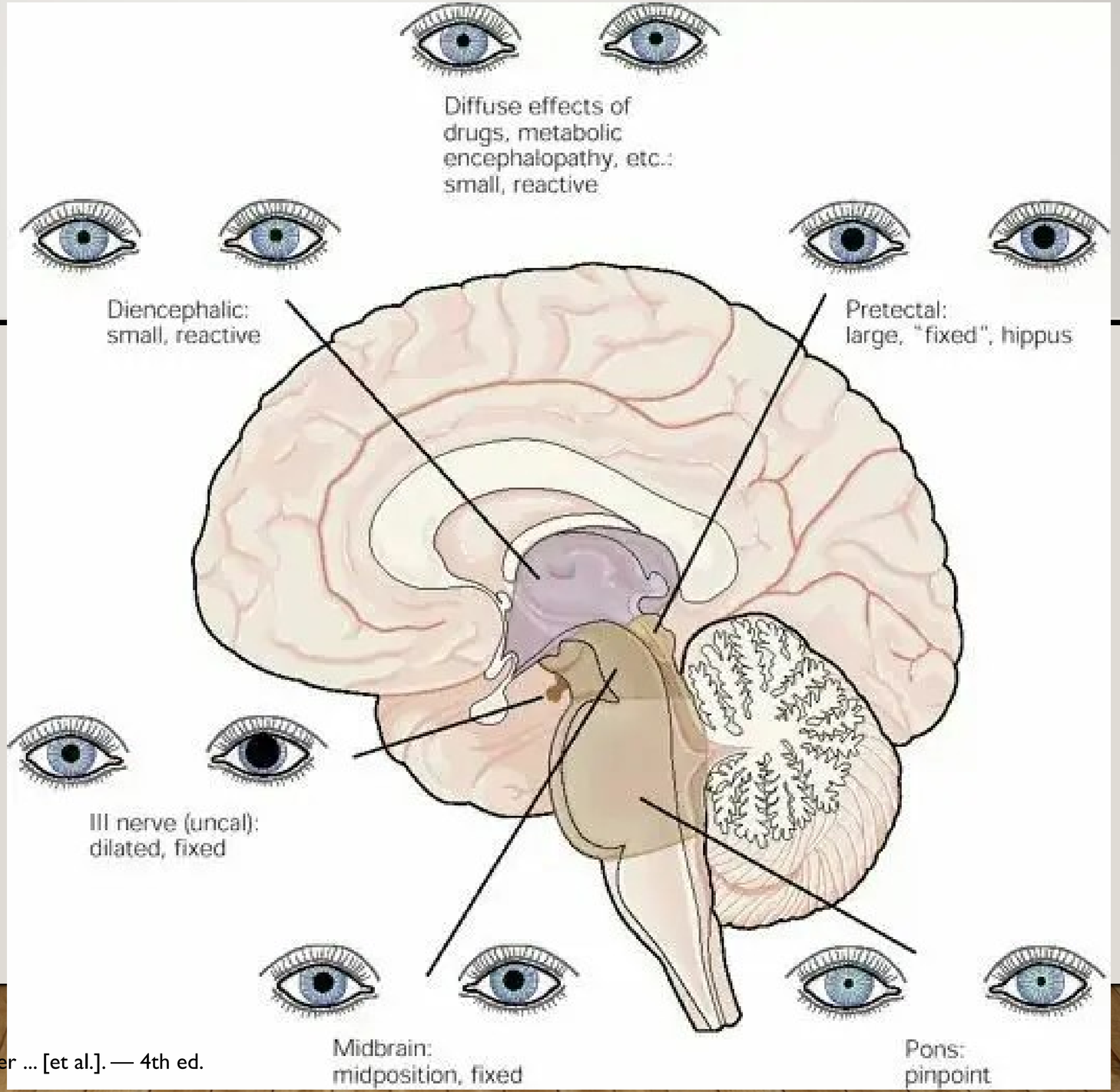
Single most important physical finding to differentiate structural vs metabolic

- Illumination - penlight vs camera flash
- At least for 10 secs - Tonic pupils react slowly
- If pupils are very small - ideally a plus 20 lens maybe used
- Remember r/o pharmacologic dilation

Ref: for penlight vs camera flash IR can read the discussion.

LOCALISING VALUE OF PUPILLARY RESPONSES

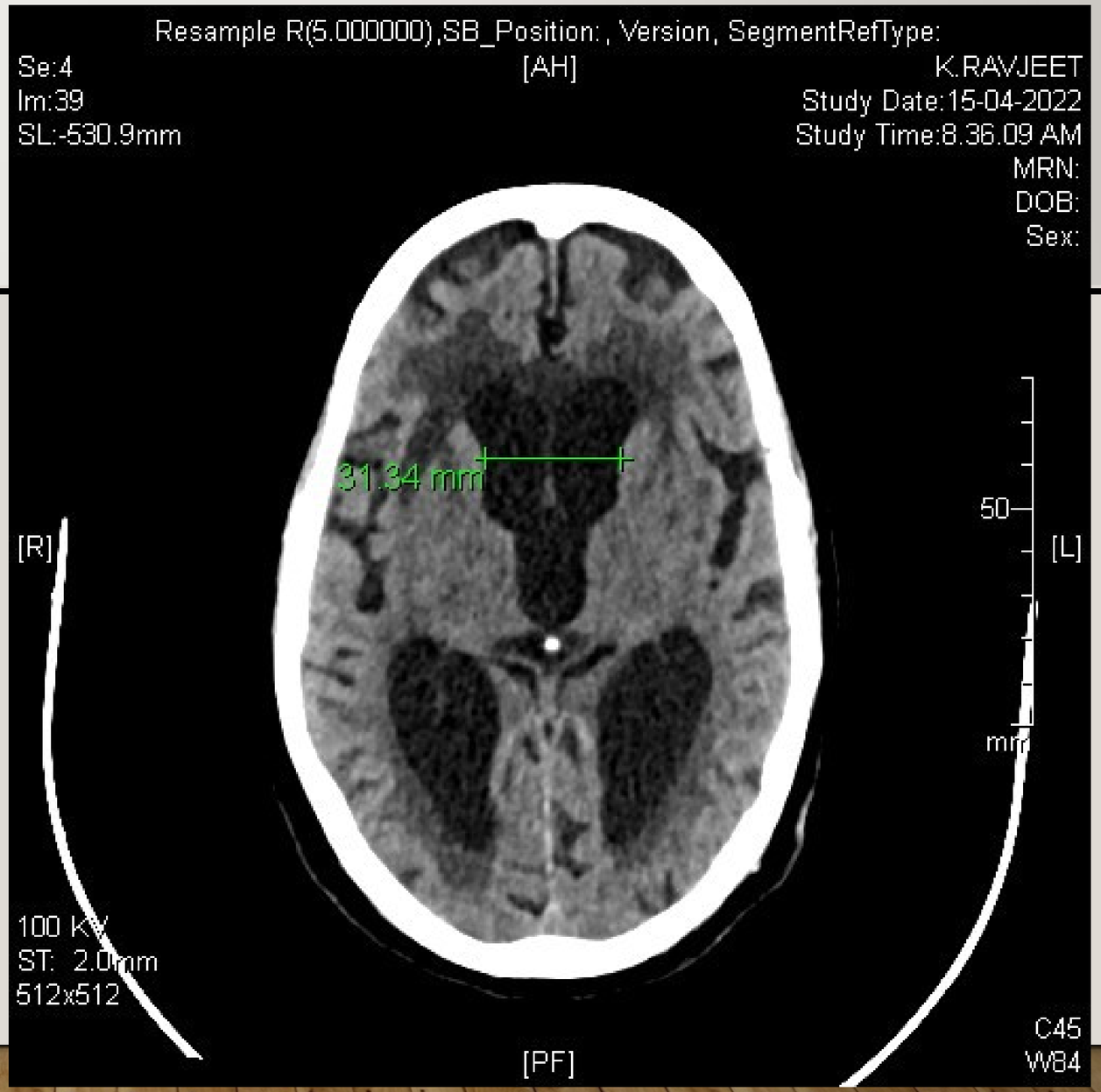
- Unilateral enlarged poorly reactive pupils - first sign of herniation (or an aneurysm in PCOM)
- Look for Horner's
- Metabolic vs Diencephalic - both cause small, reactive pupils (difficult to appreciate response) . Pupillary light reflex is most one of the most resistant brain responses to metabolic insults.
- During or following seizures pupils may be large or poorly reactive to light. Look for tongue bite/ incontinence /



- Ref: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

Clinical Vignette 3:

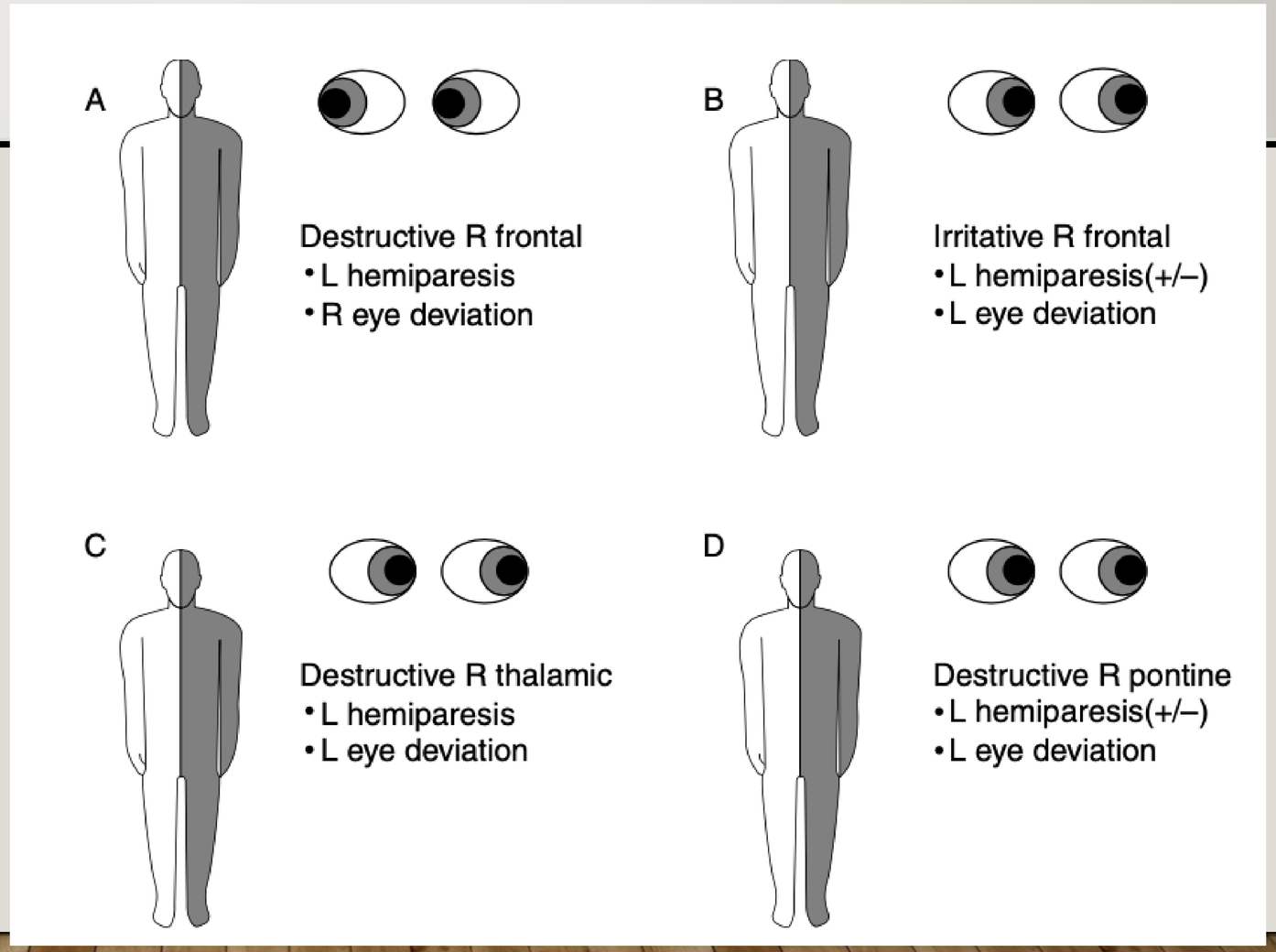
- A 76y lady with HTN, DM
- sudden onset altered mental status for last 18h
- E3V3M5
- Eyes deviated downwards and nasally
- Tone increased in all 4 limbs
- Generalised hyperreflexia
- B/L extensor Plantar



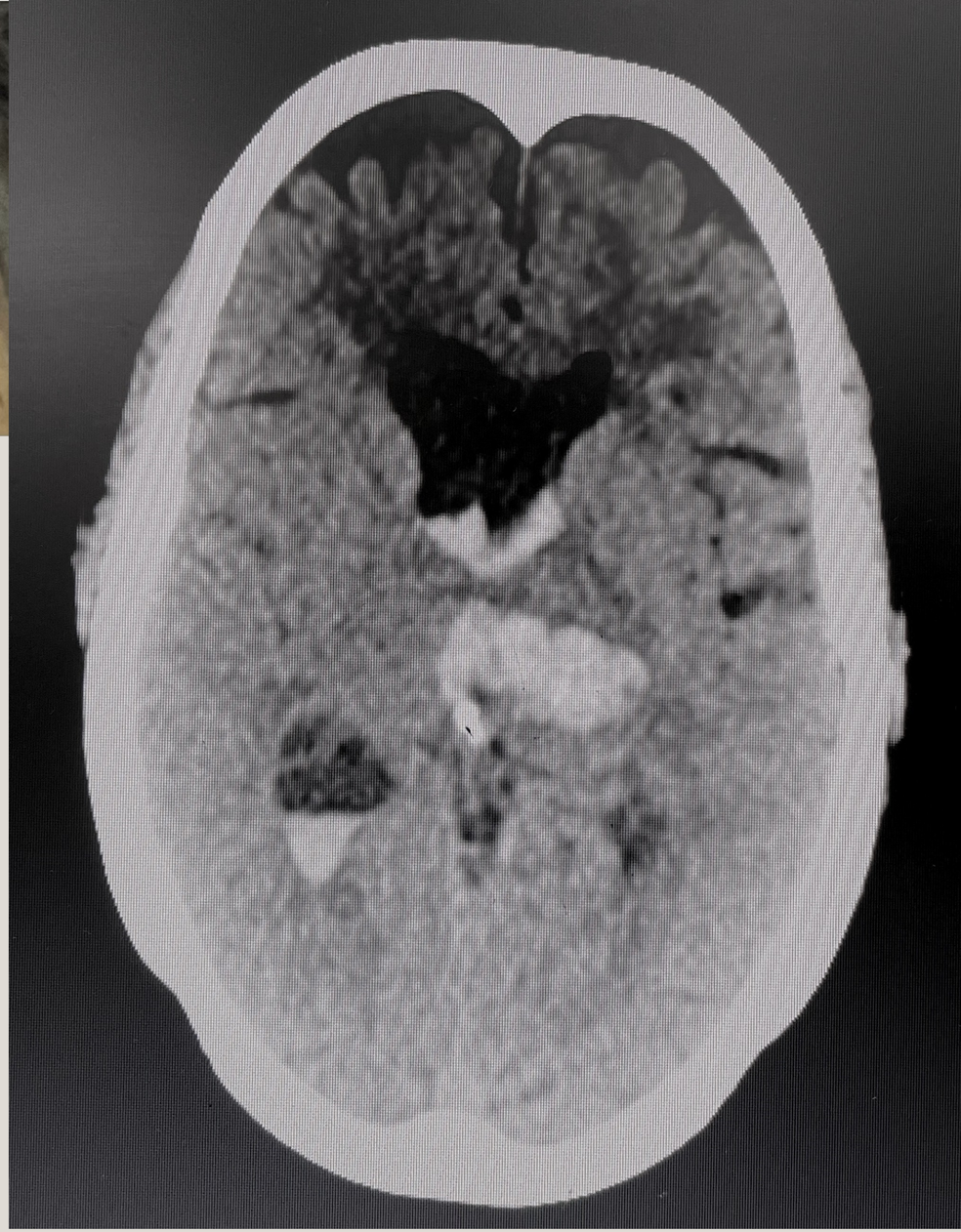
Ref : Chowdhury, S., Singh, R.K., Vibha, D. *et al.* Transient obstruction of aqueduct of sylvius: rare case of spontaneously resolving acute hydrocephalus. *Acta Neurol Belg* (2022). https://doi.org/10.1007/s13760-022-02074-0

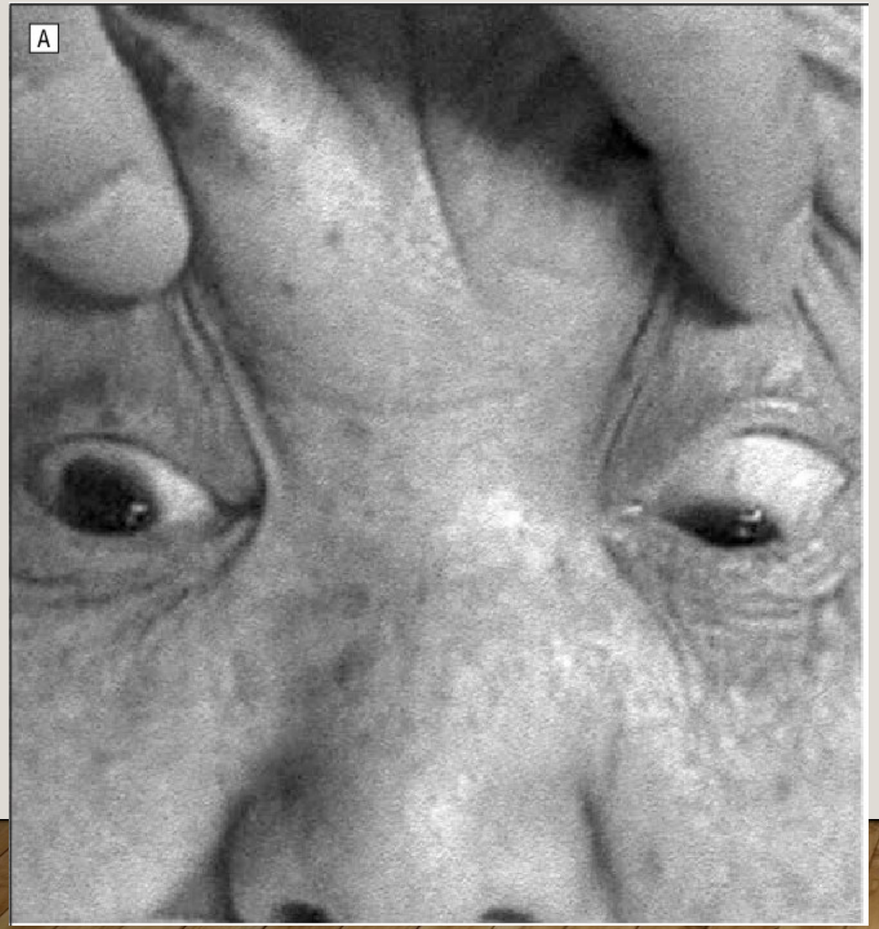
RESTING AND SPONTANEOUS EYE MOVEMENTS

- Gaze Preferences :
- Conjugate Deviations of the eye
  a. To the side of lesion
  b. Away “Wrong way”
  c. Downward and nasally
- Skew Deviation



Ref: Neurology : a clinician’s approach / Andrew Tarulli. 2011





Ref: Choi, Kwang-Dong et al. “Specificity of "peering at the tip of the nose" for a diagnosis of thalamic hemorrhage.” Archives of neurology 61 3 (2004): 417-22 .

- Ref: Jeanneret V, Beach PA, Kase CS. Ocular Dipping in Anoxic Brain Injury. *JAMA Neurol.* 2019;76(10):1252. doi:10.1001/jamaneurol.2019.2393

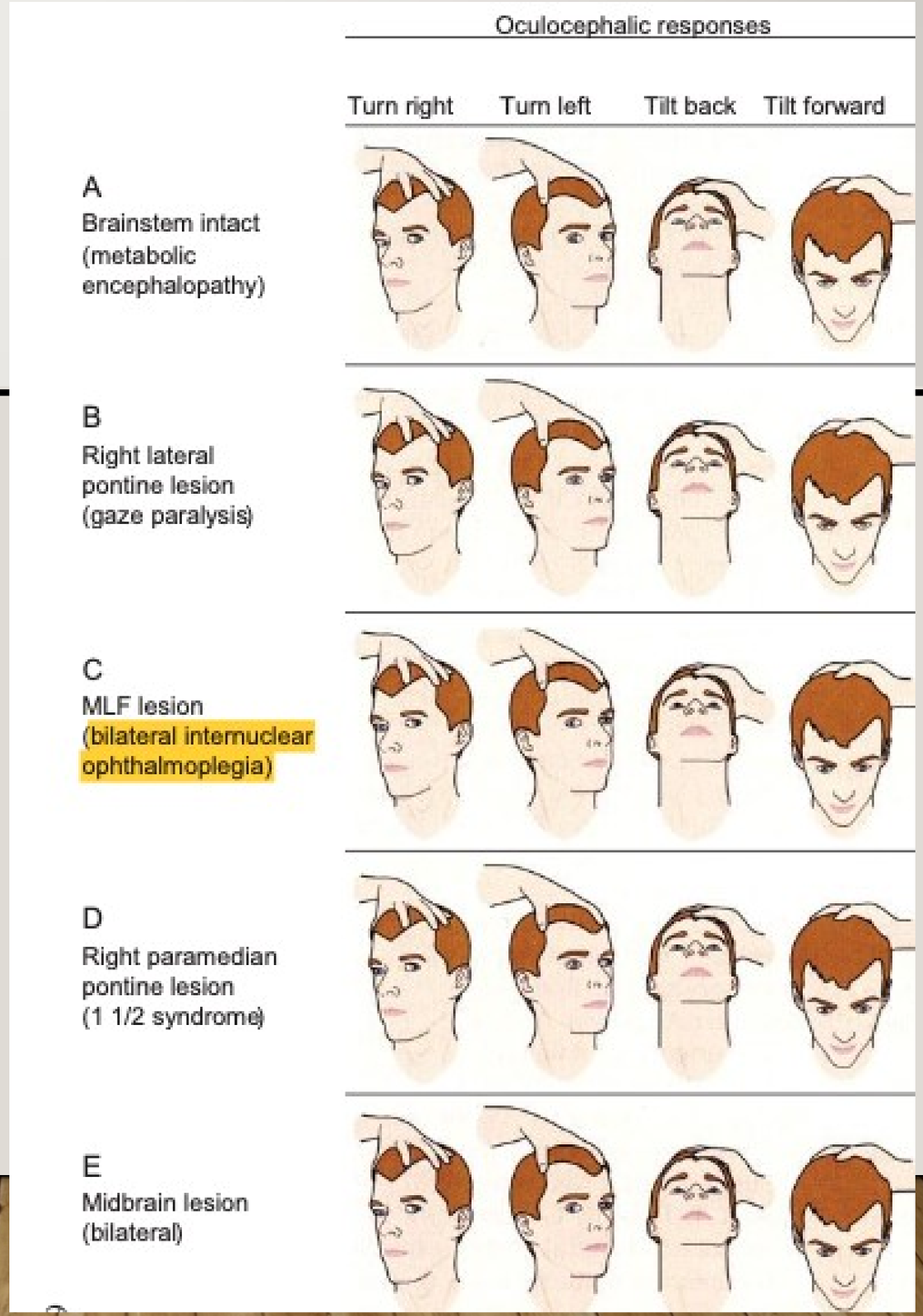
OCULOCEPHALIC RESPONSES

Pathway of eye movements overlap extensively with arousal system

Structural disease = unusual to have a normal oculocephalic response

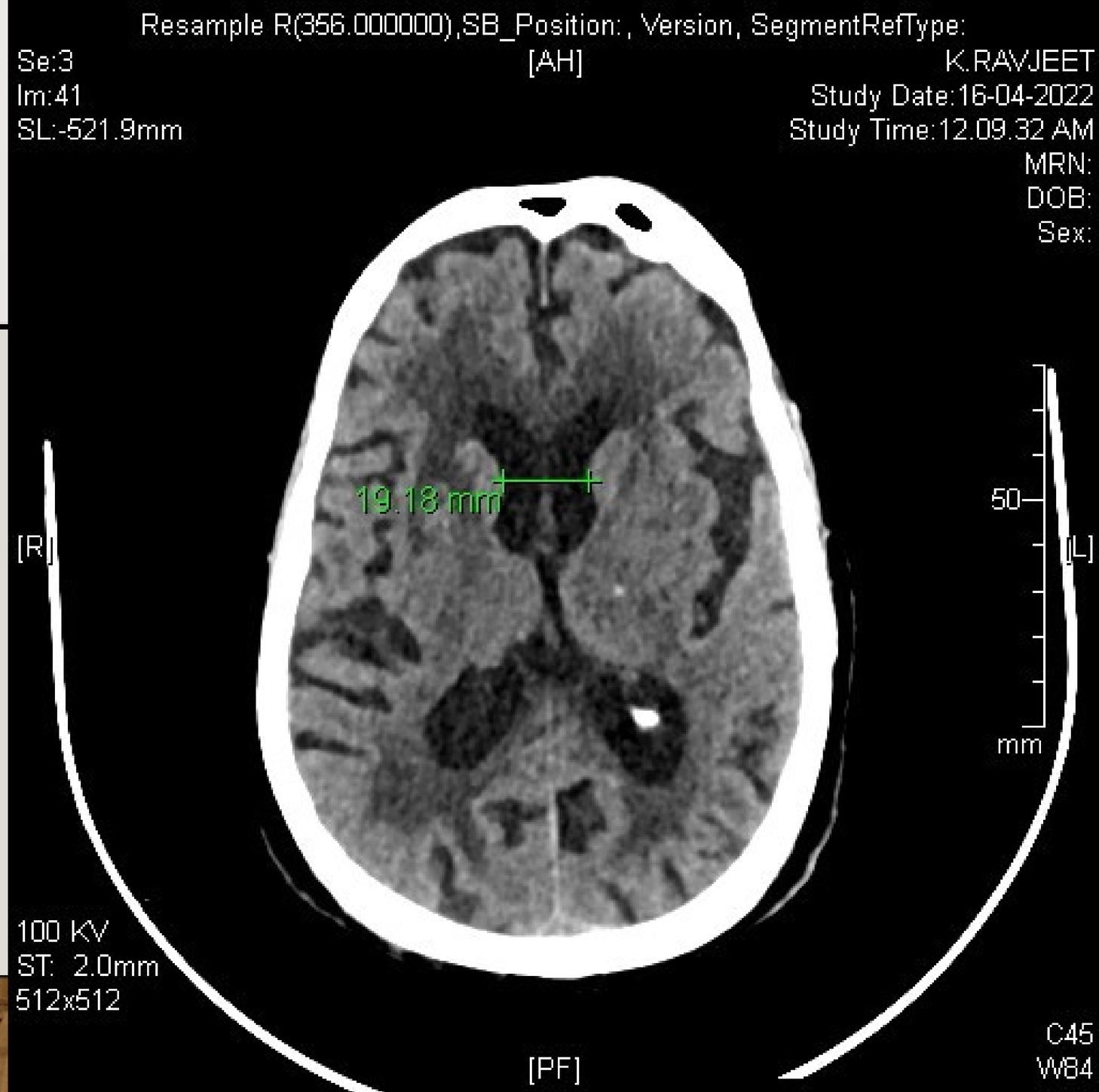
Vs Metabolic = usually it is normal
Even exaggerated in Hepatic encephalopathy

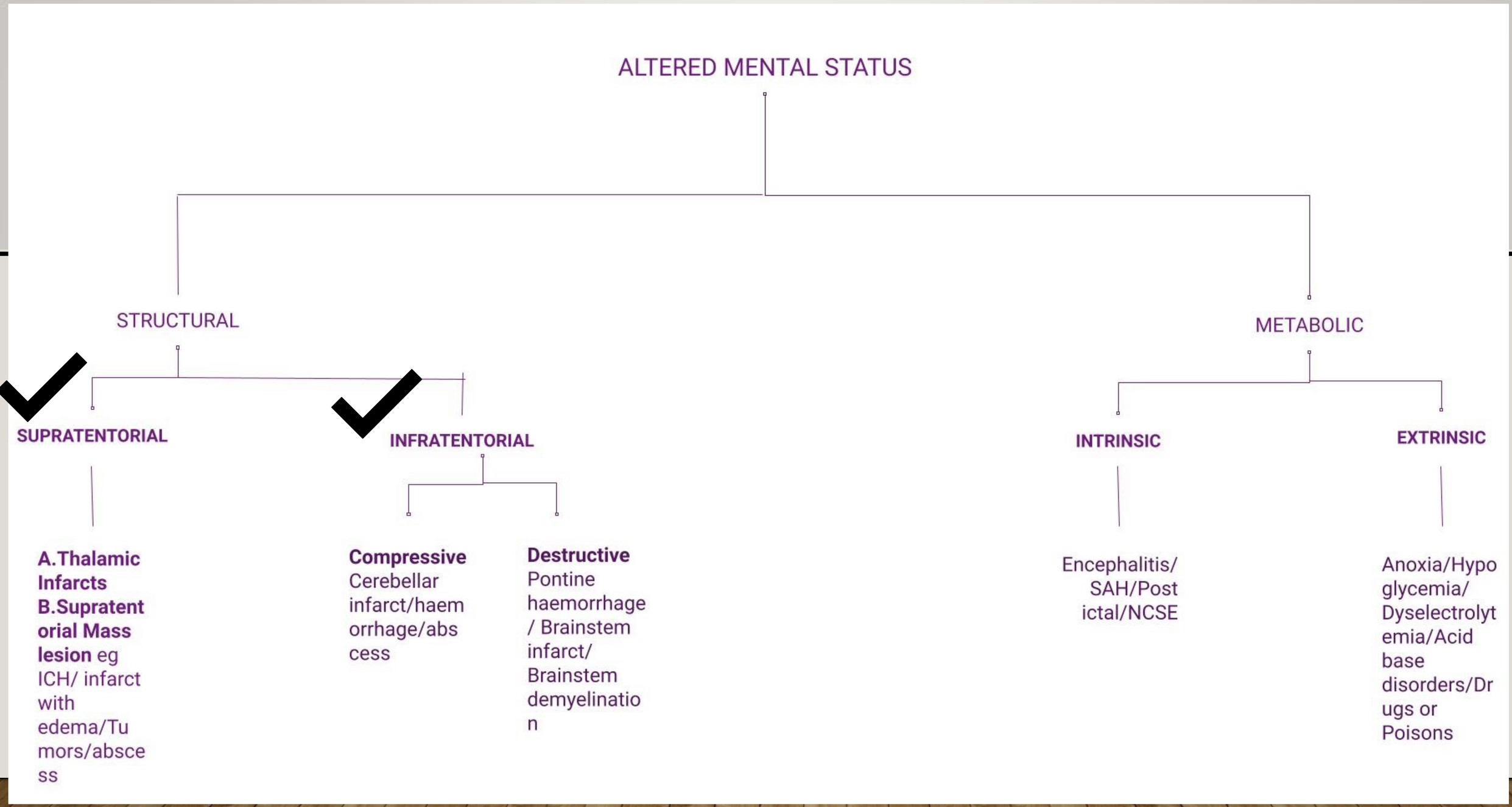
Deeply comatose = eye movements may be sluggish or not at all



- Ref: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

- Patient improved spontaneously over the next 12 h

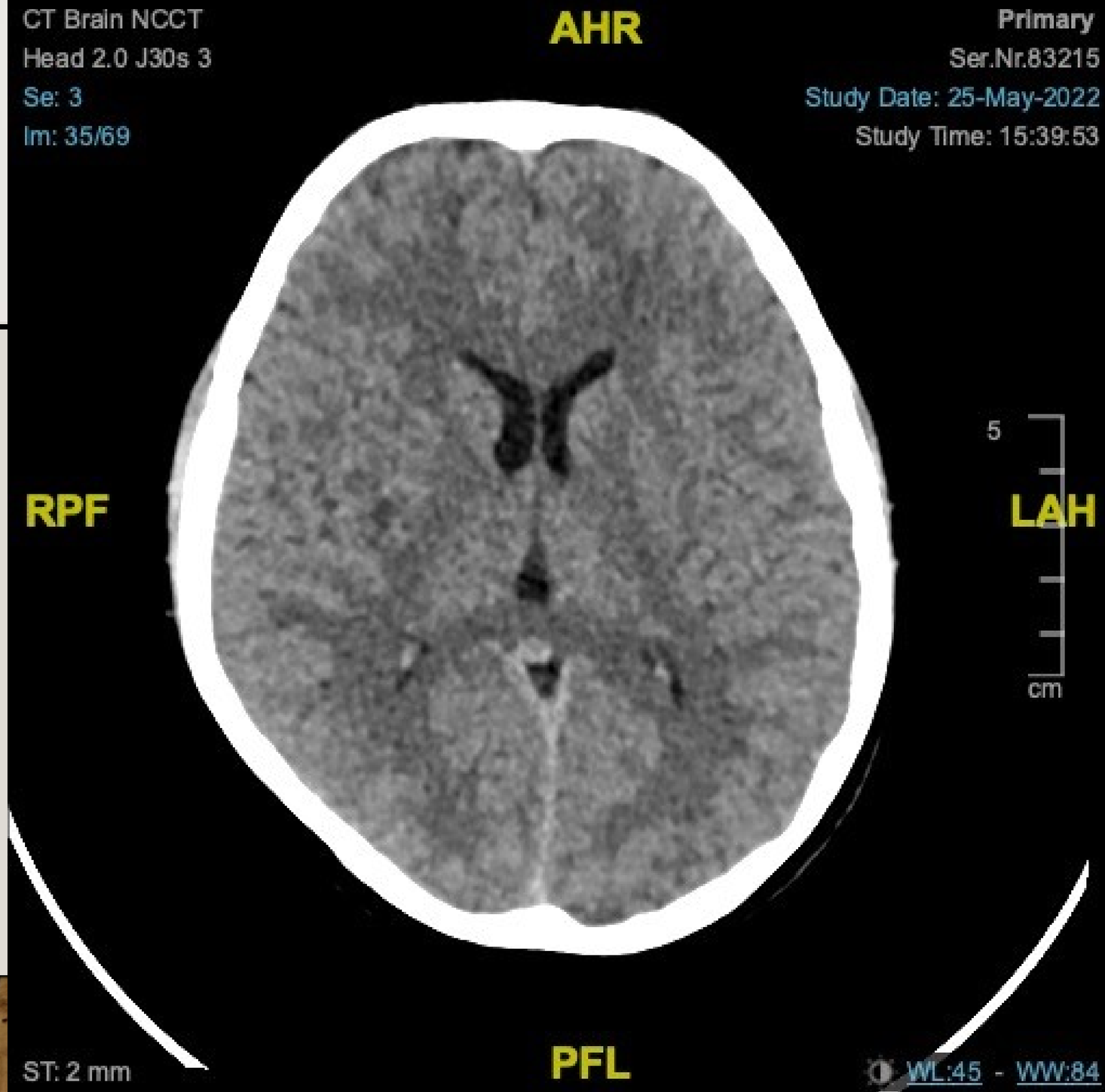




- Adapted From: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

Clinical Vignette 4

- 19 y male, no comorbidities
- Headache for 2 days
- 1 episode of vomiting at home
- In the ER 1 episode of tonic posturing became M4
- HR 42/min
- NO MENINGEAL SIGNS
- NCCT head - apparently normal



DIAGNOSTIC ACCURACY OF KERNIG'S SIGN, BRUDZINSKI'S SIGN, AND NUCHAL RIGIDITY FOR PATIENTS WITH SUSPECTED MENINGITIS

Sign	No. of patients		
	With meningitis[a]	Without meningitis	All
Kernig's[b]			
Present	3	8	11
Absent	63	163	226
Brudzinski's[c]			
Present	3	8	11
Absent	63	162	225
Nuchal rigidity[d]			
Present	24	69	93
Absent	56	148	204

NOTE. LR^-, likelihood ratio for a negative test result; LR^+, likelihood ratio for a positive test result.

[a] Defined as ⩾6 WBCs/mL of CSF.

[b] Sensitivity, 5%; specificity, 95%; positive predictive value, 27%; negative predictive value, 72%, LR^+, 0.97; LR^-, 1.0; ratio of LR^+ to LR^-, 0.97.

[c] Sensitivity, 5%; specificity, 95%; positive predictive value, 27%; negative predictive value, 72%; LR^+, 0.97; LR^-, 1.0; ratio of LR^+ to LR^-, 0.97.

[d] Sensitivity, 30%; specificity, 68%; positive predictive value, 26%; negative predictive value, 73%; LR^+, 0.94; LR^-, 1.02; ratio of LR^+ to LR^-, 0.92.

Karen E. Thomas, Rodrigo Hasbun, James Jekel, Vincent J. Quagliarello, The Diagnostic Accuracy of Kernig's Sign, Brudzinski's Sign, and Nuchal Rigidity in Adults with Suspected Meningitis, Clin Infect Dis, Volume 35, Issue 1, 1 July 2002, Pages 46–52, https://doi.org/10.1086/340979

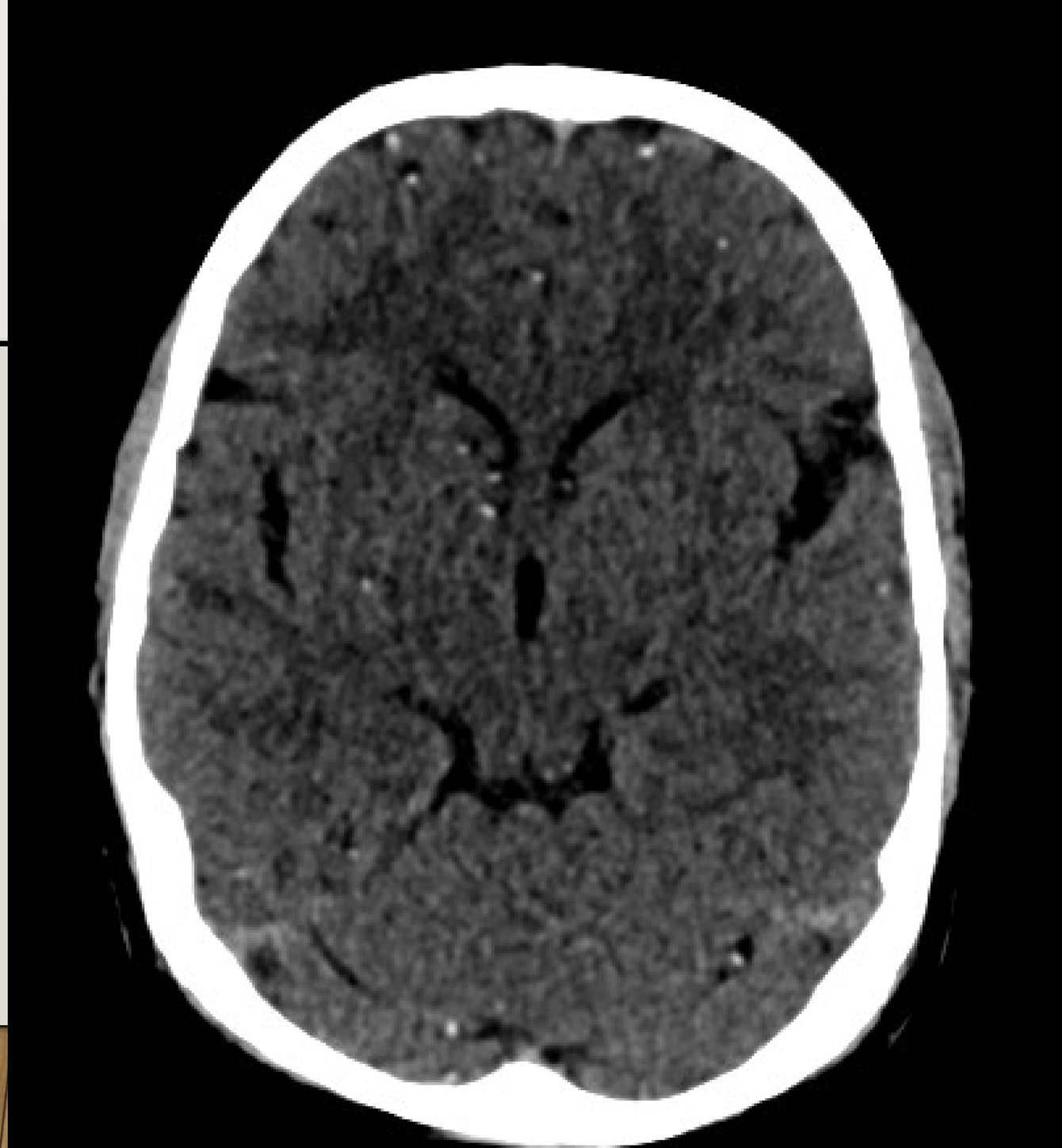
- B/L Papilloedema

- Guarded LP was done - CryAg Positive
  >1:256 titre, India ink +
- HIV Negative
- Prevalence of Cryptococcal meningitis in India 1.09% *

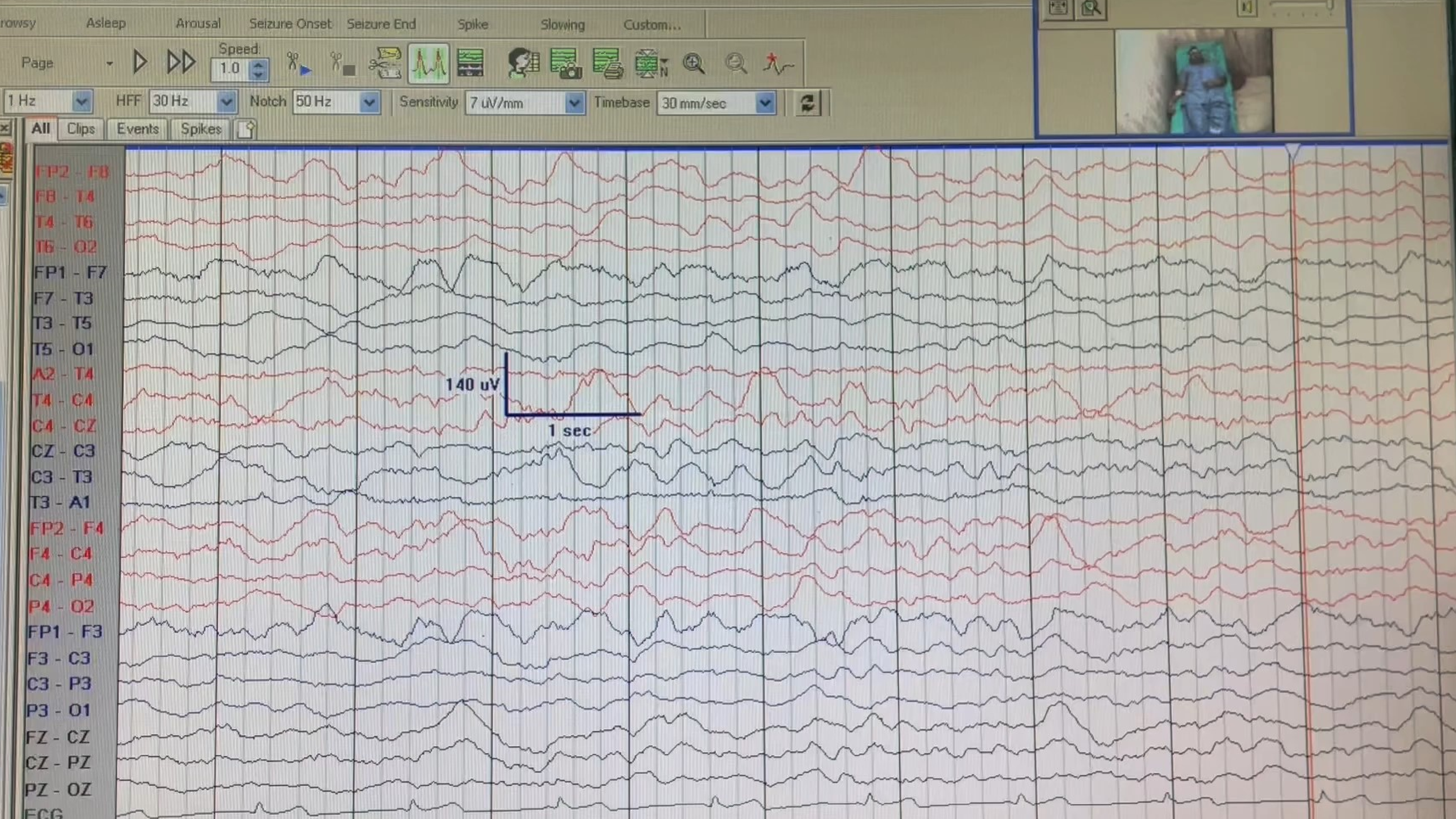
Ref: Mohanty A, Bhatia M, Kabi A, Chatterjee K, et al Cryptococcal meningitis:…. hospital-based cross-sectional study. J Family Med Prim Care. 2019 Jun;8(6):2008-2011.

Clinical Vignette 5

- 26 y Male
- Headache with metamorphospsia
- Operated for retinal neurocysticercosis
- 1 day of irrelevant talk, agitation
- GCS E4V3M5
- Pupils normal size, reactive to light
- Fundus : B/L papilloedema
- NCCT head : Multiple NCC with focal perilesional edema in frontal lobe



- Focal perilesional edema in frontal —-> altered behaviour
- However does it explain a reduced state of awareness ?


rowsy
Asleep
Arousal
Seizure Onset
Seizure End
Spike
Slowing
Custom...
Page
Speed:
1.0
1 Hz
HFF
30 Hz
Notch
50 Hz
Sensitivity
7 uV/mm
Timebase
30 mm/sec
All
Clips
Events
Spikes
FP2 - F8
F8 - T4
T4 - T6
T6 - O2
FP1 - F7
F7 - T3
T3 - T5
T5 - O1
A2 - T4
T4 - C4
C4 - CZ
CZ - C3
C3 - T3
T3 - A1
FP2 - F4
F4 - C4
C4 - P4
P4 - O2
FP1 - F3
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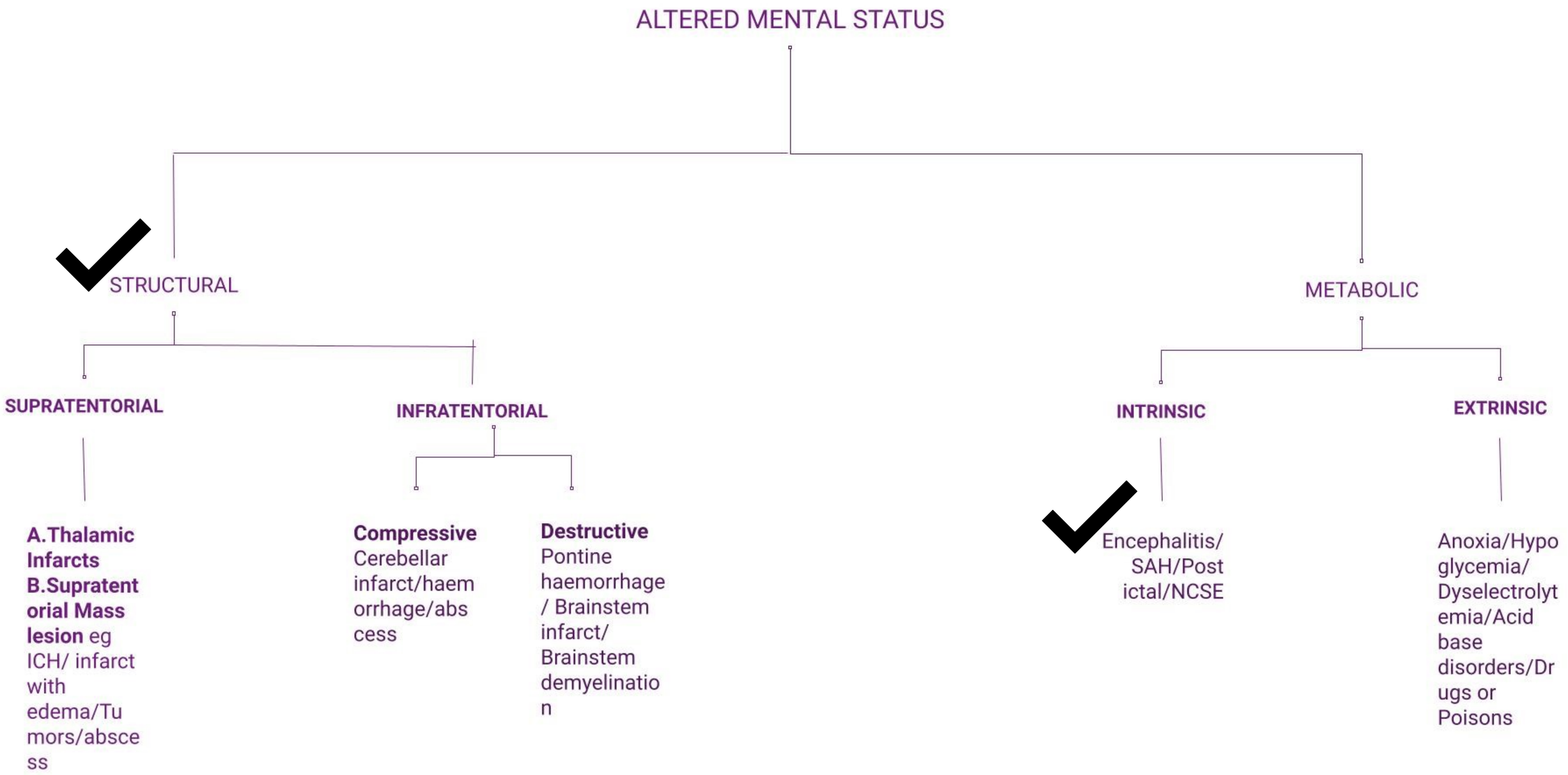
FZ - CZ
CZ - PZ
PZ - OZ
ECG
140 uV
1 sec

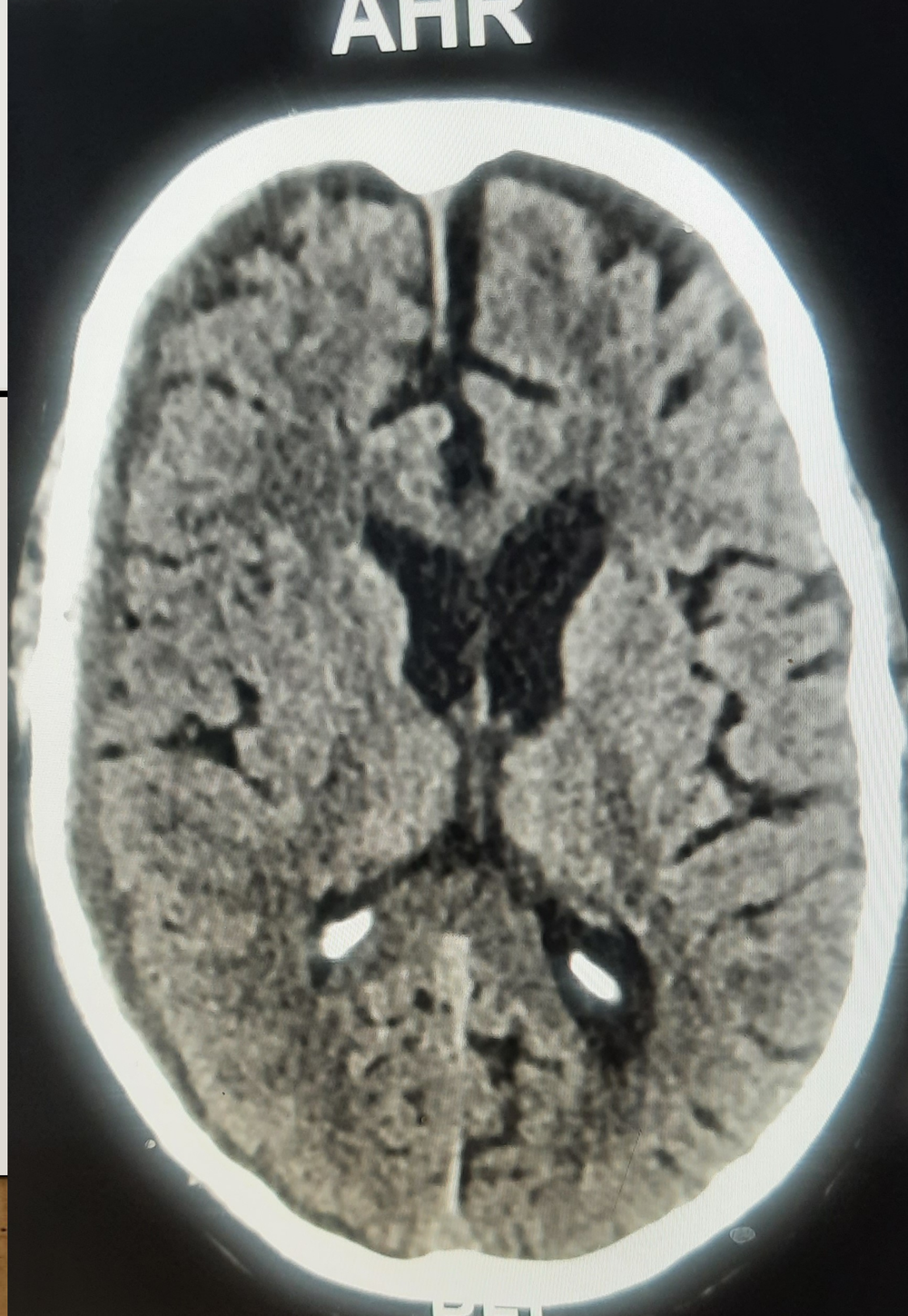


- Adapted From: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

Clinical Vignette 6

- 83 y gentleman
- non-valvular atrial fibrillation on Apixaban
- right parietal subdural hematoma following a traumatic fall.
- CEEG- diffuse slowing with C4-T4 spike-wave activity. Focal status epilepticus
- treatment at discharge: 100 mg BD brivaracetam, 200 mg BD lacosamide, and 10 mg BD clobazam).

- Readmitted with reduced level of consciousness
- (GCS) score was E3V3M5
- (CT) of the head revealed no significant changes
- EEG diffuse theta slowing (not responsive to midazolam)
- serum ammonia 197 micromole/L



DRUGS CAUSING HYPERAMMONEMIA

- Valproate
- Topiramate
- Carbamazepine
- 5-FU
- Rifabutin
- Acetazolamide

HOW TO SEND AMMONIA LEVELS:

1. Pre prandial (3-4 hr) sample
2. Without any tourniquet
3. Preferably pre chilled but not frozen

Ref: Meijer R, Vivekananda U, Balestrini S, Walker M, Lachmann R, Haeberle J, Murphy E. Ammonia: what adult neurologists need to know. Pract Neurol. 2020 Dec 11:practneurol-2020-002654. doi: 10.1136/practneurol-2020-002654. Epub ahead of print. Erratum in: Pract Neurol. 2021 Dec;21(6):e5. PMID: 33310884.

- Laboratory Investigations to Rule out Metabolic encephalopathy :
- RBS
- ABG
- ECG
- CBC, LFT, RFT
- Serum Electrolytes : Na+, Ca2+, Mg2+
- Tox screen
- CXR

Clinical Vignette 7

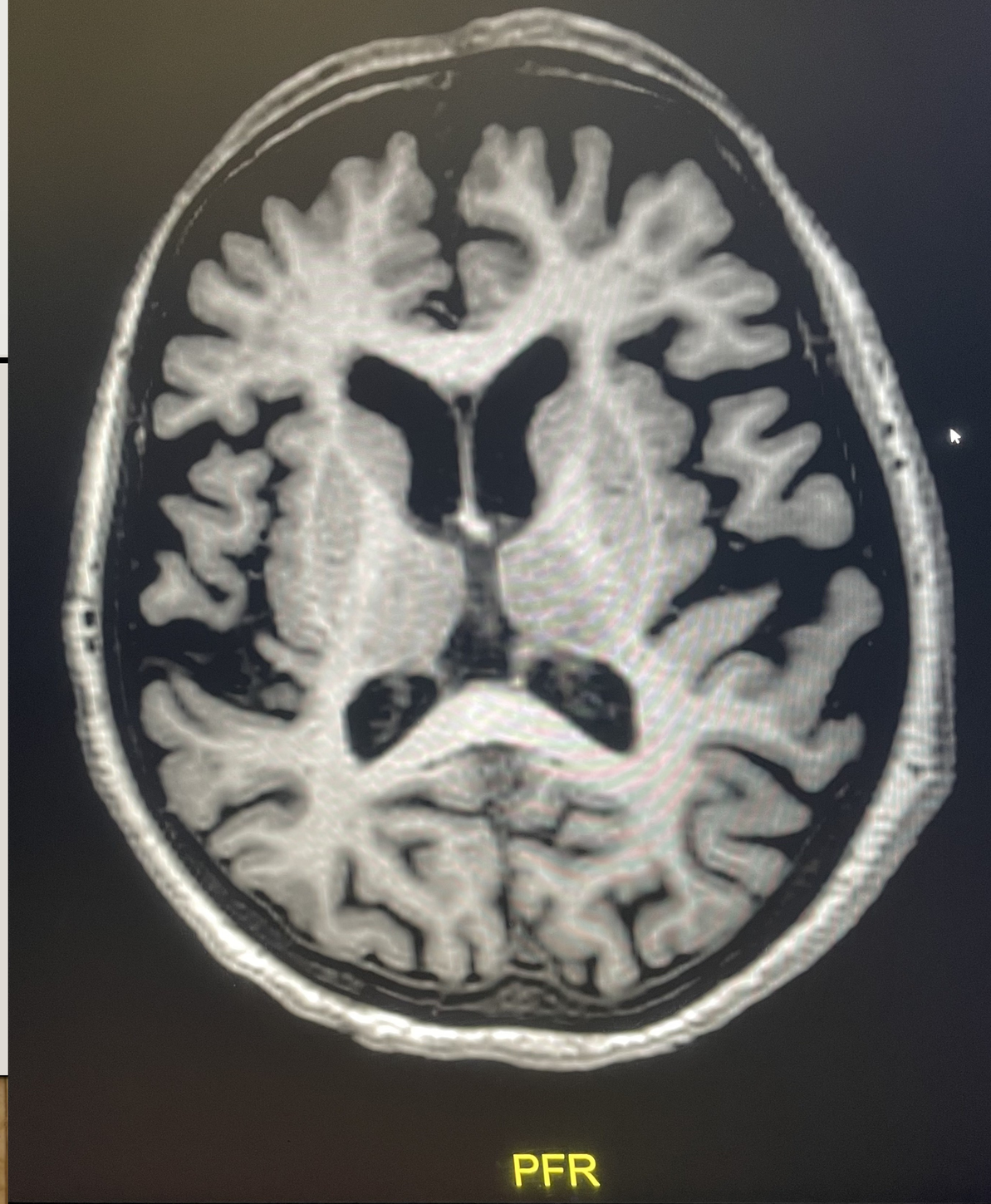
88 y gentleman, HTN

Admitted to medicine with low grade fever

6h after admission patient became incoherent, agitated, confused

Sr Electrolytes - WNL

Urine R/E, C/S awaited



DELIRIUM

Acute change in attention, awareness, cognition

- ~~Failure of attention~~
- Distractibility
- Perseveration
- Failure to focus
- Patients in early metabolic encephalopathy
  - disoriented to time—->place——>person
- Hallucinations
- Altered sleep wake cycle
- Reversible cognitive decline

Ref: 1. Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed. 2. Han JH, Wilber ST. Altered mental status in older patients in the emergency department. *Clin Geriatr Med*. 2013;29(1):101-136. doi:10.1016/j.cger.2012.09.005

PRECIPITATING FACTORS FOR DELIRIUM

- 208 patients
- Infections (49.5%) - M/C Lung > UTI
- Fluid and electrolyte disturbances
- Drugs (30.8%) - M/C Bzd>anti-depressants> anti-psychotics

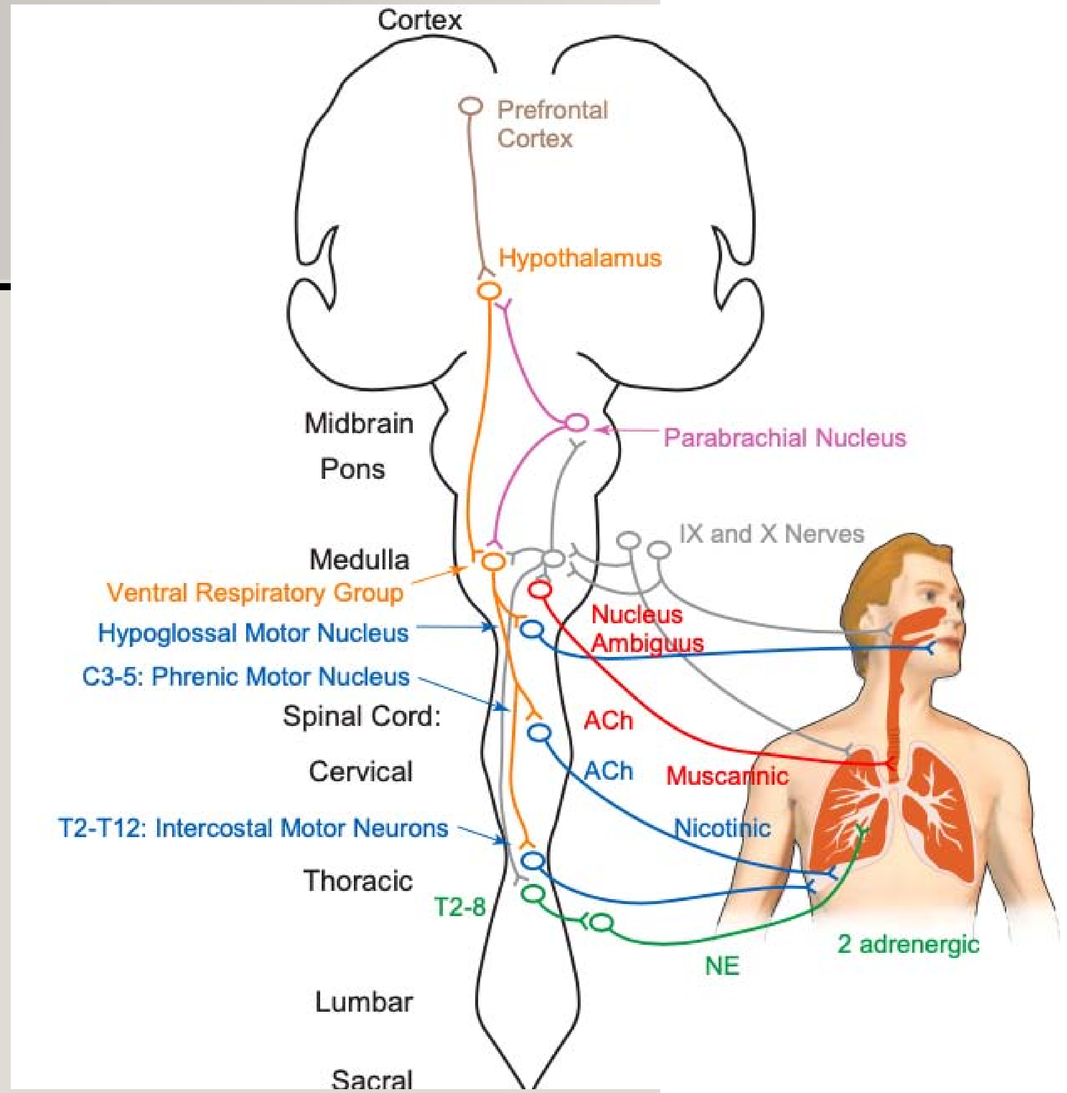
Ref :Inouye SK, Charpentier PA. Precipitating Factors for Delirium in Hospitalized Elderly Persons: Predictive Model and Interrelationship With Baseline Vulnerability. *JAMA*. 1996;275(11):852–857. doi:10.1001/jama.1996.03530350034031

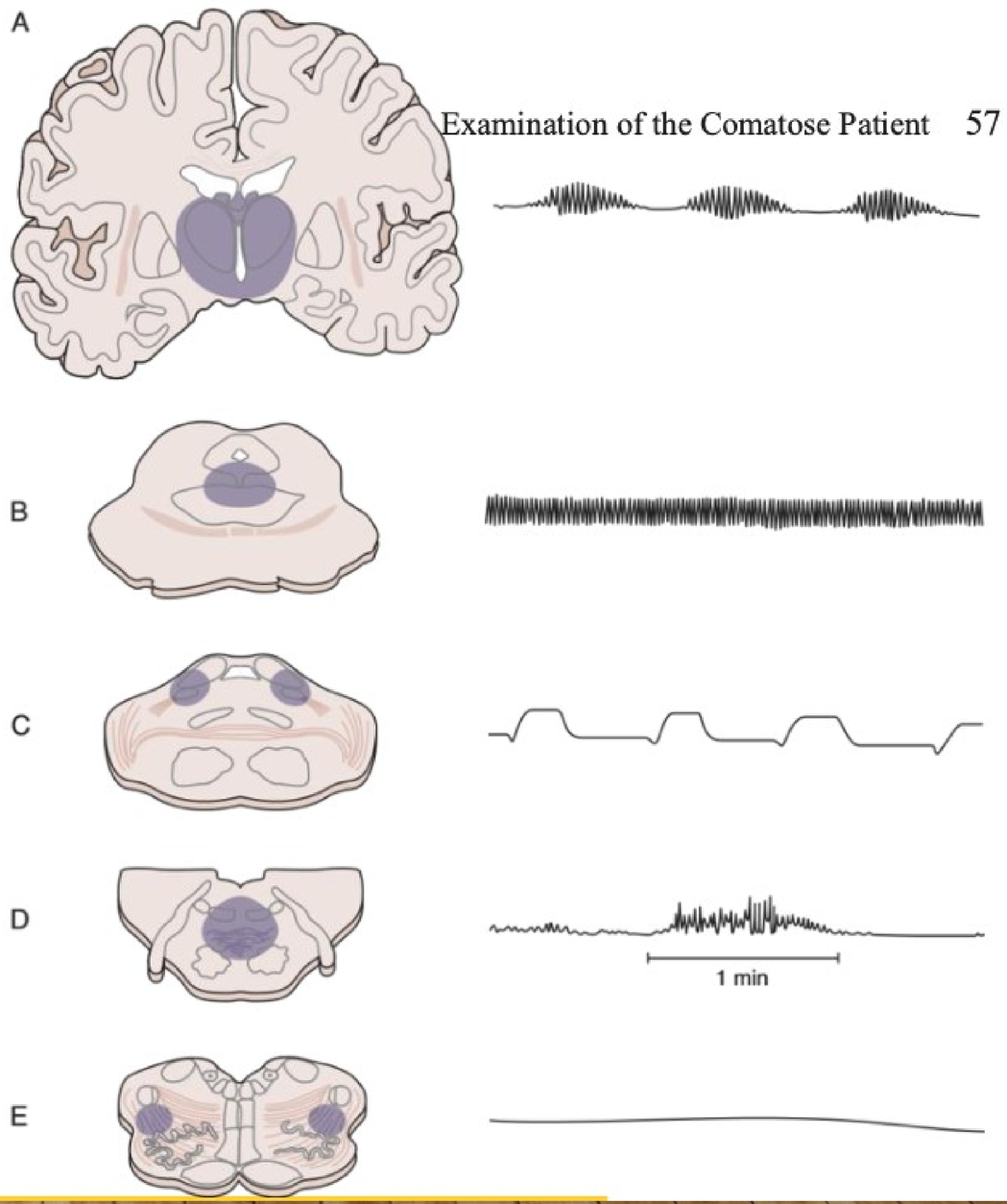
Clinical Vignette 8

- 15 y male Acute onset progressive drowsiness over last 2-3 days
- O/E E2V2M5
- Pupils - small, reactive to light
- Kussmaul breathing
- Moves all 4 limbs to pain
- Reflexes brisk
- Terminal Neck Rigidity +
- Dehydration ++
- RBS = 490
- Ketone bodies in urine positive

BREATHING

In intubated patients, observe in PSV





- Ref: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

CHEYENES STOKES RESPIRATION

Requires intact brainstem functions

- Medullary chemoreceptors sense pAO2 and reduce respiratory drive

---

- pCO2 rises
- But there is delay in transit time
- By then PCO2 is at higher levels
- Ramped up respiration
- By the time brain sense fall in PCO2, ACo2 falls further
- Respiration slows or ceases
- So the periodic cycling is due to delay in the feedback loop

KUSSMAUL BREATHING

Points toward Metabolic cause

- ~~Deep slow rhythmic breathing~~
- Low blood pH——-> deep respiratory efforts
- Compensatory Respiratory alkalosis

- Ref: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

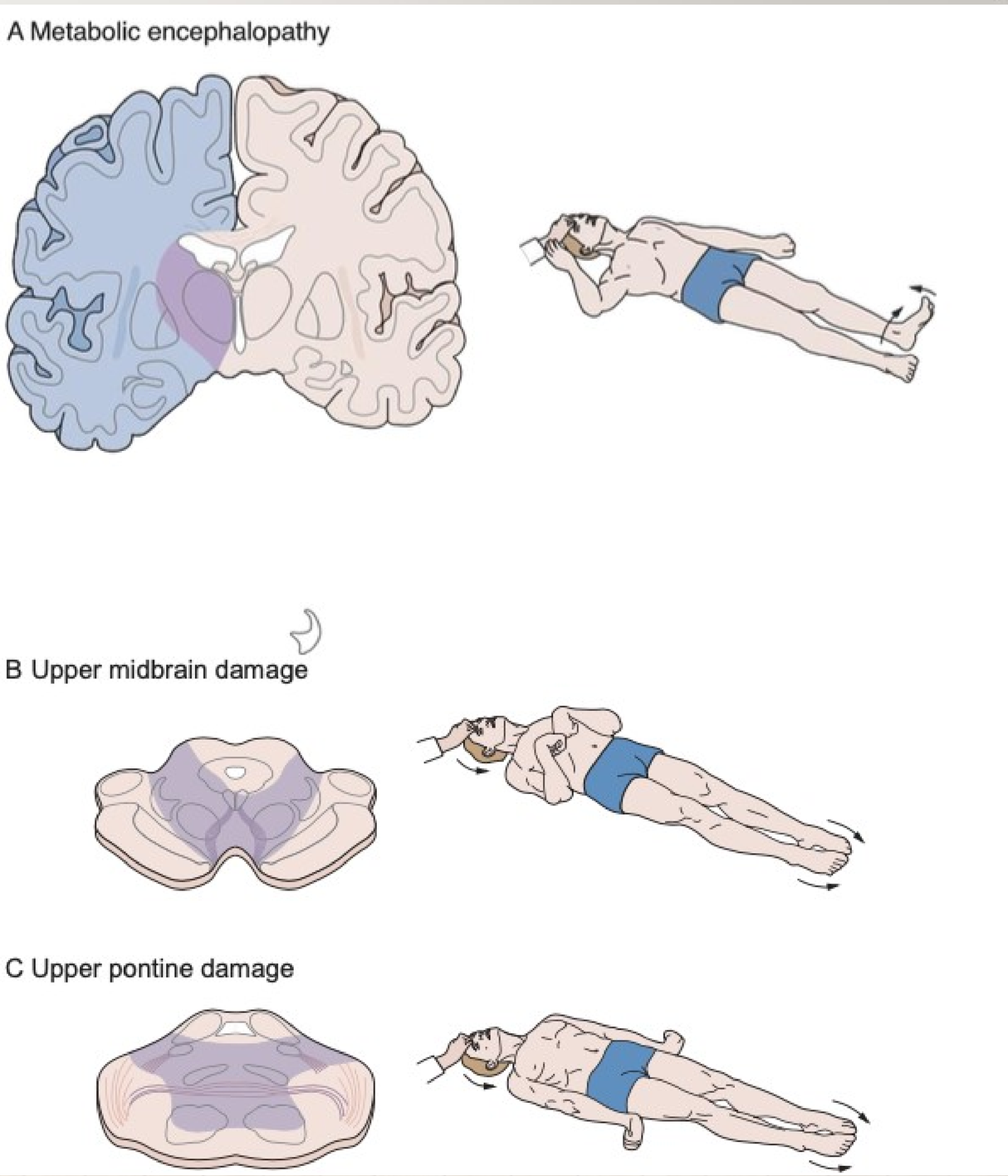
Clinical Vignette 9

- 21 y F, k/c/o pallidopyramidal syndrome
- Fever + drowsiness for 8 days
- Intubated in ER for poor GCS
- E1VtM5
- Pupils - small, reactive
- Tone - Rigidity + +
- Reflexes 3 +
- B/L Plantars Flexor

- Review history : Stopped Syndopa for last 2 weeks
- ~~CK 10,510~~
- LDH 2800

Motor Responses in AMS

- Diffuse metabolic encephalopathy - ~~Gegenhalten~~
- As patients become more stuporous muscle tone tends to decrease and pathologic forms of rigidity becomes less apparent
- Frontal release signs may appear



- Ref: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

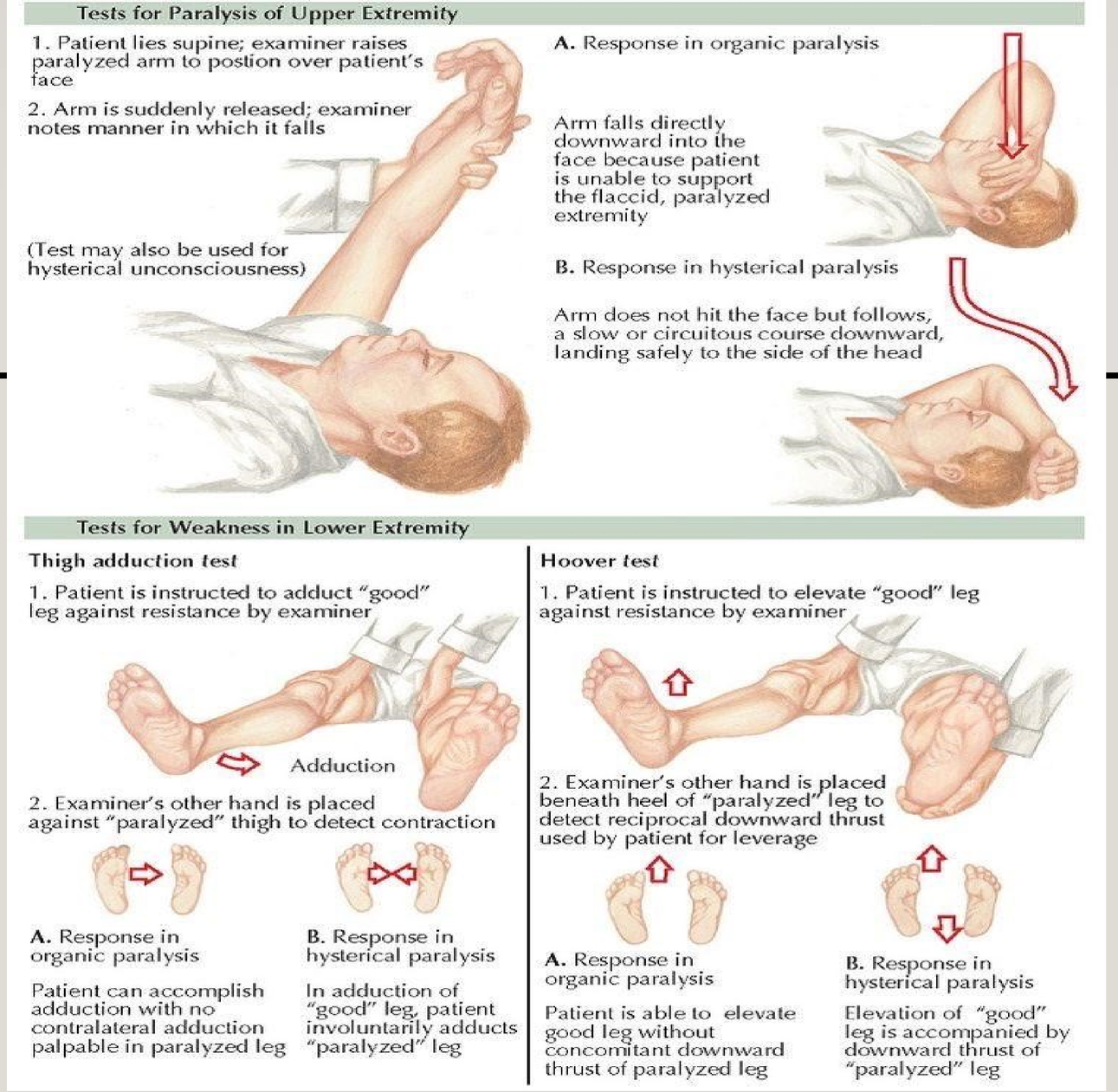
Clinical Vignette 10

- 36 y, M, alcoholic
- Sudden B/L loss of vision right after landing
- 1 episode of B/L tonic clonic seizures
- Rapidly progressed to E1V1M1
- NCCT Head - Normal

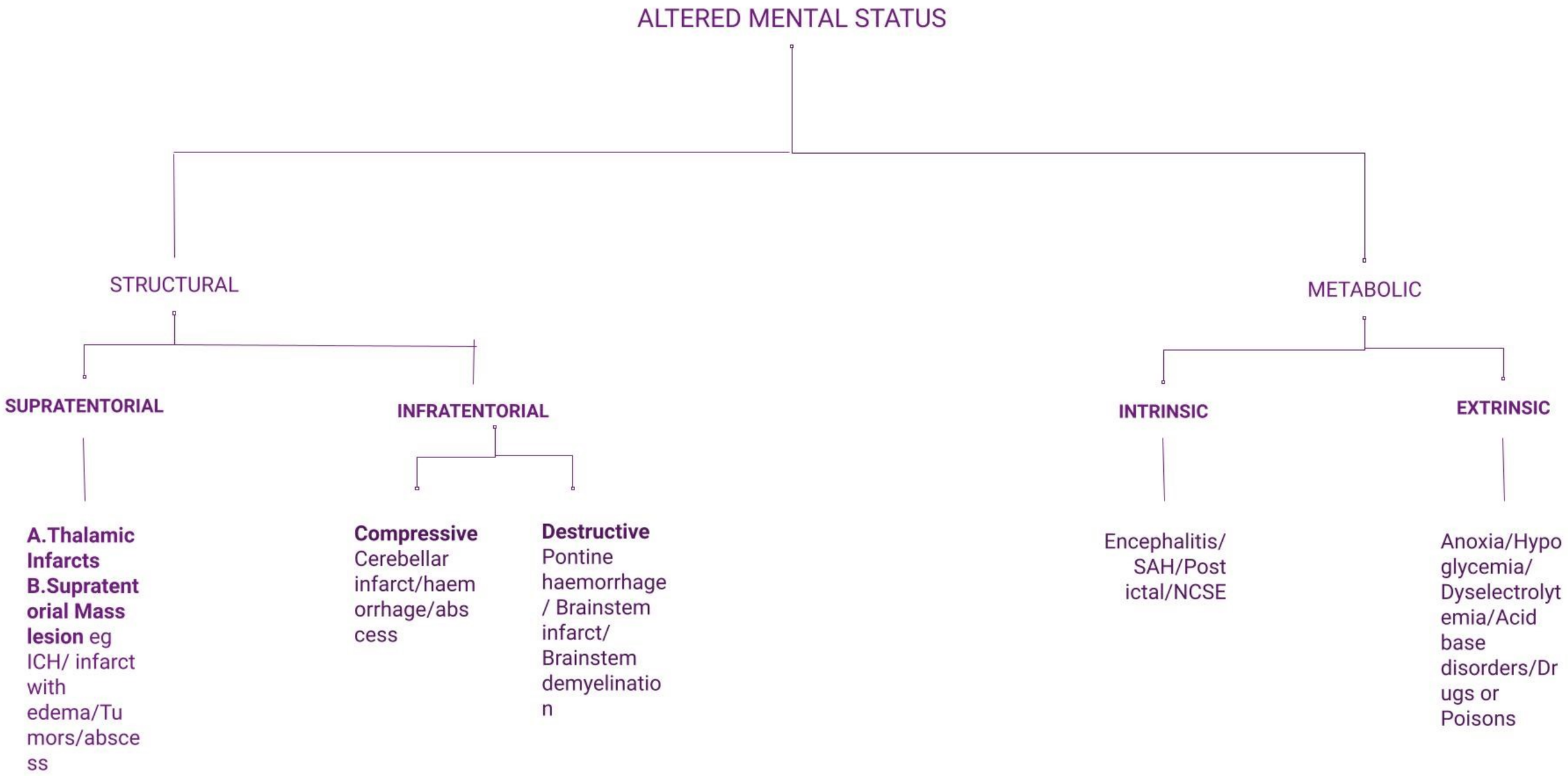
pH	6.845
HCO3-	6.1
pCO2	35
Anion Gap	20.9

- On further review of history : Consumption of illicit liquor a few hours prior to boarding the flight

Only 1% of all emergency cases

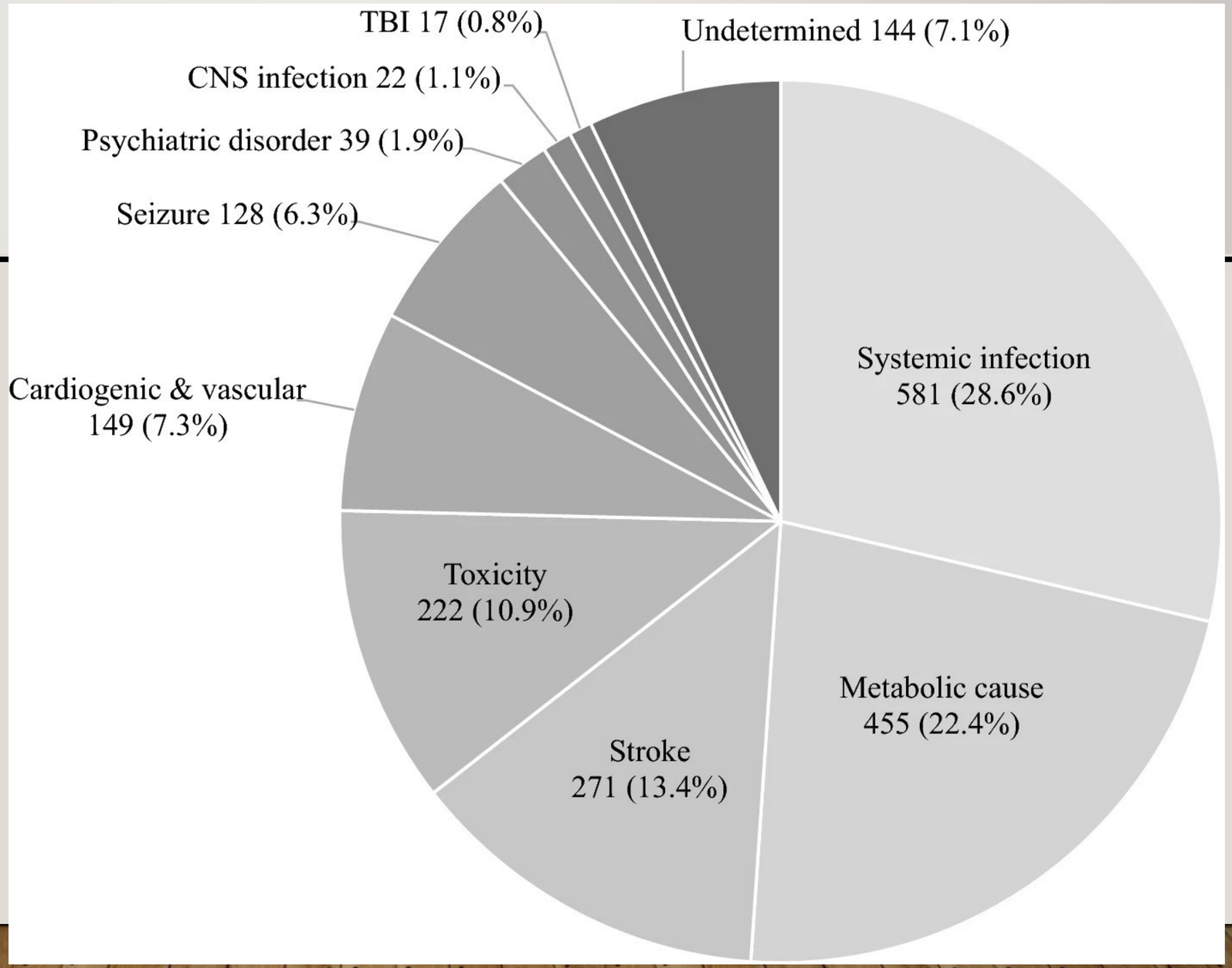


- Ref: Kim, K.T., Jeon, J.C., Jung, CG. *et al.* Etiologies of altered level of consciousness in the emergency room. *Sci Rep* 12, 4972 (2022). https://doi.org/10.1038/s41598-022-09110-2



- Adapted From: Plum and Posner's diagnosis of stupor and coma / Jerome B. Posner ... [et al.]. — 4th ed.

- Etiologies of altered mental status in ER
- Analysed 2028 discharges from ER admitted with Altered level of consciousness
- University Hospital, 2018-2020



- Ref: Kim, K.T., Jeon, J.C., Jung, CG. *et al.* Etiologies of altered level of consciousness in the emergency room. *Sci Rep* 12, 4972 (2022). https://doi.org/10.1038/s41598-022-09110-2

- small pupils (<2 mm) – opioid toxicity or a pontine lesion
- midsize pupils (4–6 mm) unresponsive to light – midbrain lesion
- ~~maximally dilated pupils (>8 mm) – drug toxicity, eg anticholinergic~~ overdose
- mixed and dilated pupil(s) – 3rd (oculomotor) nerve lesion from uncal herniation.

THE PATTERN OF BREATHING SHOULD BE ASSESSED AS WELL AS THE RESPIRATORY RATE

- KUSSMAUL RESPIRATION – DEEP, LABOURED BREATHING, INDICATIVE OF SEVERE METABOLIC ACIDOSIS AND COMMONLY ASSOCIATED WITH DIABETIC KETOACIDOSIS.
- SHALLOW WITH AN EXTREMELY DEPRESSED RESPIRATORY RATE SEEN IN OPIATE OVERDOSE.
- ATAXIC BREATHING (BIOT'S RESPIRATION) – GROUPS OF QUICK, SHALLOW INSPIRATIONS FOLLOWED BY REGULAR OR IRREGULAR PERIODS OF APNOEA, SUGGESTING A LESION IN THE LOWER PONS.11
- CENTRAL NEUROGENIC HYPERVENTILATION – BREATHING CHARACTERISED BY DEEP AND RAPID BREATHS AT A RATE OF AT LEAST 25 BREATHS PER MINUTE INDICATING A LESION IN THE PONS OR MIDBRAIN.12
- CHEYNE–STOKES BREATHING IS SEEN WITH MANY UNDERLYING PATHOLOGIES AND IS NOT HELPFUL IN MAKING A fiRM DIAGNOSIS.

WHAT COULD BE AT ONCE FATAL!

- Cardiac arrest
- Airway obstruction
- Breathing (oxygenation)

WHAT COULD BE FATAL IN NEXT FEW MINUTES?

- Hypoglycemia
- Overdose
- Intracranial hypertension and herniation

- Neuro: Pupils, eye movements; moving all 4 extremeties?; reflexes; any asymmetry?
- Signs of impending herniation: Hypertension, bradycardia, irregular respirations, posturing, dilated pupil?
- Breathing pattern: Regular, Cheyne-Stokes, irregular, apnea?
- Toxidrome: Vital signs, pupils, skin
- Signs of shock: skin warm or cold? BP?
- Trauma: Any clear signs of trauma?
- Abdomen: Any obvious pain? Masses?

WHAT COULD BE FATAL IN NEXT 10 MINUTES?

- Still the ABCs!
- Hypotension
- Anaphylaxis
- Hyperkalemia
- Acute MI
- Aortic disasters

WHAT COULD BE FATAL IN NEXT FEW HOURS?

~~Stroke~~

ICH

Sepsis

Alcohol withdrawal

Status Epilepticus

Metabolic encephalopathies

Others

Summing up:

- STEP 1 : A,B,C, Vitals, RBS
- STEP 2: History (Attention to baseline cognitive status, change in medication)
- Examination (Look for signs of Structural causes, FND)
- ABG, CBC, LFT, RFT(including Ca, Mg), ECG,CXR,Tox Screen
- STEP 3 : CT f/b MRI if indicated
- Lumbar Puncture
- STEP4: Guided by Findings on initial evaluation
- Serum ammonia, TFT, Morning Cortisol, ANA, anti TPO, EEG

Ref : Douglas VC, Josephson SA. Altered mental status. Continuum (Minneap Minn). 2011 Oct;17(5 Neurologic Consultation in the Hospital):967-83. doi: 10.1212/01.CON.0000407055.17661.33. PMID: 22809977.

INITIAL INVESTIGATIONS IN AN UNCONSCIOUS PATIENT

- Full blood count
- Blood glucose – even if the capillary blood glucose is normal
- Urea and electrolytes
- Calcium and bone profile
- Liver function tests
- Clotting screen
- Toxicology screen – including paracetamol, salicylate and blood alcohol level electrocardiogram (ECG)
- Chest X-ray
- Arterial blood gas – including carbon monoxide concentration
- Blood cultures should be taken from patients with fever or suspected sepsis, preferably before the administration of empirical antibiotics
- Other microbiology samples should be taken based on the clinical assessment

TREATMENT/ MANAGEMENT

- Ensure oxygenation
- Maintain circulation
- Control glucose
- Lower intracranial pressure
- Stop seizures
- Treat infection
- Restore acid-base balance and electrolyte balance
- Adjust body temperature
- Administer thiamine
- Consider specific antidotes (naloxone, flumazenil)
- Control agitation

Primary review
ABC
Immobilise cervical spine if traumatic injury possible

→ Urgently address compromise identified in ABC
> Seek help from critical care
> Commence supportive measures

↓

Measure capillary glucose
Check pupil size and reactivity
Calculate Glasgow coma score

→ Treat hypoglycaemia with intravenous glucose
Treat suspected opioid toxicity with intravenous naloxone

↓

Obtain collateral history
Perform full head to toe examination, including ABCDE
In parallel with help from colleagues:
> Intravenous access
> Request blood tests, CXR and ECG
> Inform CT scanner that urgent scan required

→ If diagnosis not clear, evidence of trauma or focal neurological deficit proceed to urgent CT brain scan

→ Treat suspected working diagnosis if diffuse physiological, metabolic or psychiatric
but
Proceed to CT brain scan if no improvement or diagnosis remains uncertain

↓

Commence supportive care
Request help from critical care if required

→ Discuss diagnosis and prognosis with patient
Consider ceiling of care and cardiopulmonary resuscitation status

UNCONSCIOUSNESS IS A TIME-SENSITIVE MEDICAL EMERGENCY WHERE EARLY PHYSIOLOGICAL STABILITY AND DIAGNOSIS ARE VITAL IN OPTIMISING PATIENT OUTCOMES

AN INITIAL ASSESSMENT OF AIRWAY, BREATHING, AND CIRCULATION MUST BE PERFORMED TO IDENTIFY AND MANAGE THE MOST IMMEDIATE THREATS TO LIFE

ALL FACETS OF CARE, HISTORY, EXAMINATION, INVESTIGATION AND TREATMENT/MANAGEMENT SHOULD BE DELIVERED IN PARALLEL BY A TEAM WORKING IN A SYSTEMATIC WAY

EVEN IN THE APPARENT ABSENCE OF TRAUMA, ESPECIALLY IN OLDER PATIENTS OR PATIENTS TAKING ANTICOAGULANTS, BRAIN INJURY OR TRAUMA SHOULD STILL BE CONSIDERED

SENIOR PHYSICIANS MUST BE INVOLVED EARLY IN THE CARE OF AN UNCONSCIOUS PATIENT, TO LIAISE WITH CRITICAL CARE AND SPEAK WITH THE PATIENT'S RELATIVES OR ADVOCATES, ESPECIALLY WHEN DECISIONS REGARDING CARDIOPULMONARY RESUSCITATION OR CEILING OF CARE ARE REQUIRED

Thank You