MEDICAL-SURGICAL NURSING II · STUDY GUIDE

Exam 2 Study Guide

This guide covers chapters 3 and 4. You will learn why perfusion equals mean arterial pressure minus intracranial pressure, how the stroke clock and the CT decide thrombolysis, and why the blood pressure you allow in an ischemic stroke is the pressure you lower in a bleed. Then you will work through the timed algorithms for status epilepticus, the headache red flags, and the first hour of bacterial meningitis. Work one chapter at a time. Read the "what to know" paragraphs, study the tables, then try each worked case with the steps covered. Finish each chapter with its ten self-test items. The cram sheet at the end puts the clocks and targets in one place.

WHAT THIS GUIDE COVERS

- Chapter 3 · arterial territories, cerebral perfusion pressure and autoregulation, level of consciousness, the Glasgow Coma Scale, left and right hemisphere strokes, the penumbra and TIA, last known well, the NIHSS, thrombolysis and its criteria, thrombectomy, blood pressure targets, intracerebral and subarachnoid hemorrhage, nimodipine and vasospasm, Monro-Kellie, herniation, ICP measures, swallow screening, delegation and secondary prevention.
- Chapter 4 · seizure mechanism and types, bedside care and documentation, provoked seizures, the five-minute rule and status epilepticus algorithm, antiseizure drugs by mechanism and toxicity, migraine, tension-type and cluster headache, SNOOP red flags, giant cell arteritis, bacterial meningitis and CSF reading, the first hour, droplet precautions and prophylaxis, encephalitis and brain abscess.

CHAPTER 3

Neurologic Disorders: Stroke and Increased Intracranial Pressure

Read it in full: **Chapter 3 in the textbook**. Practice it in the lab: **Neuro Perfusion Bench: CPP, the Glasgow Coma Scale and the Territory** and **Thrombolysis Clock: Last Known Well, the Screen and the Dose**.

What to know

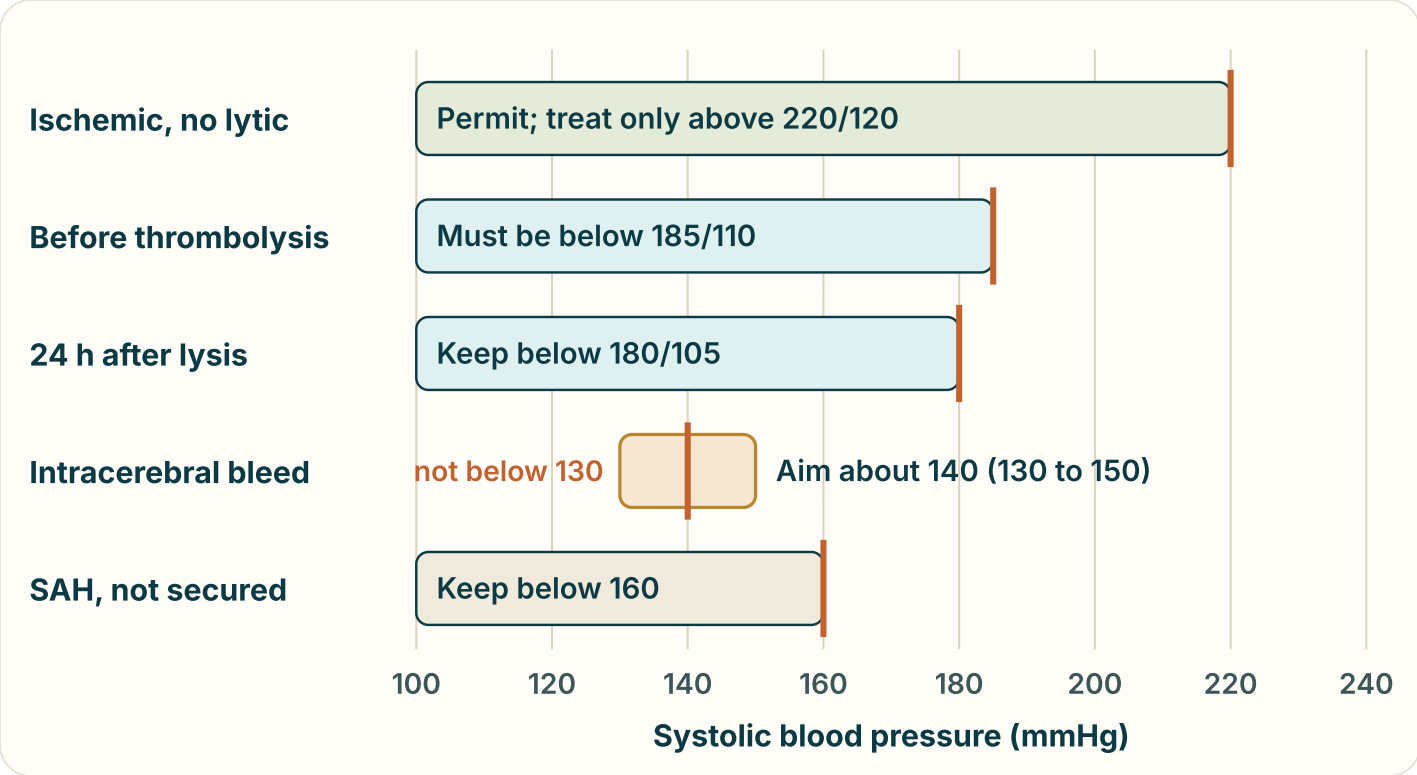
The brain stores no fuel and lives in a box that cannot expand. Two equations carry the chapter. **Mean arterial pressure** is about the diastolic pressure plus one third of the pulse pressure. **Cerebral perfusion pressure (CPP) = MAP minus ICP.** Normal ICP is 5 to 15 mmHg; sustained values above 20 to 22 are treated, and the CPP target in a monitored patient is 60 to 70 mmHg. Injured brain loses autoregulation, so its flow follows the blood pressure passively. Carbon dioxide dilates cerebral vessels: a rising CO2 raises ICP.

Level of consciousness is the earliest and most sensitive sign of neurologic decline. The **Glasgow Coma Scale** scores eye opening (1 to 4), verbal (1 to 5) and best motor (1 to 6), total 3 to 15; 8 or less is severe and usually means intubate. Score the best response in the best limb. Decorticate posturing (flexion) is a lesion above the midbrain; decerebrate (extension) means brainstem and is worse. A left hemisphere stroke brings right weakness and aphasia; a right hemisphere stroke brings left neglect, impulsivity and the highest fall risk.

About 87 percent of strokes are ischemic. The **penumbra** around the dead core is alive but at risk, and its collateral flow depends on pressure. Start the clock at **last known well**, not at discovery. Check glucose (hypoglycemia mimics stroke) and get a **non-contrast CT** to exclude blood. Alteplase is 0.9 mg/kg (maximum 90 mg), 10 percent as a 1-minute bolus and the rest over 60 minutes, within 4.5 hours; tenecteplase is 0.25 mg/kg (maximum 25 mg) as one bolus. Pressure must be below 185/110 before and below 180/105 for 24 hours after. Without a thrombolytic, permit hypertension unless above 220/120.

Hemorrhage reverses the logic. In intracerebral hemorrhage presenting with systolic 150 to 220, lower it to about 140 (not below 130) and reverse anticoagulants at once: warfarin with 4-factor PCC plus vitamin K 10 mg IV, dabigatran with idarucizumab. In aneurysmal subarachnoid hemorrhage (thunderclap headache), keep systolic below 160 until the aneurysm is secured. **Nimodipine** 60 mg orally or by tube every 4 hours for 21 days, never IV, protects against vasospasm, which begins around day 3 and peaks days 4 to 14. Hyponatremia in SAH is corrected while keeping the patient euvolemic; do not fluid-restrict.

The skull holds brain (about 80 percent), blood and CSF (about 10 percent each) (**Monro-Kellie**). Once compensation is used up, a few milliliters cause a steep rise. Early signs are a change in consciousness, then headache and vomiting, then pupil change and posturing. The **Cushing triad** (widening pulse pressure with rising systolic, bradycardia, irregular breathing) means herniation is happening now. Nursing measures: head of bed 30 degrees, head midline, no tight ties, no Valsalva, suction 10 seconds or less, space care, normothermia, isotonic fluids only. Keep CO2 at 35 to 45; brief hyperventilation is a rescue only. Keep every stroke patient NPO until a swallow screen is passed.



The same number means different things. An untreated ischemic stroke is allowed a high pressure to feed the penumbra; a bleed is driven down toward 140. Diastolic limits around lysis are 110 before and 105 after.

LOCK THESE IN

- CPP = MAP minus ICP. Target CPP 60 to 70. Normal ICP 5 to 15.
- GCS 3 to 15. Eight or less: severe, protect the airway.
- Last known well starts the clock. Non-contrast CT excludes blood; only glucose must be back first.
- Alteplase 0.9 mg/kg, maximum 90 mg, 10% bolus then 60-minute infusion, within 4.5 hours.
- BP: below 185/110 before lysis, below 180/105 for 24 h after; no lysis, treat only above 220/120; ICH about 140; SAH below 160 until secured.
- Sudden headache, vomiting or new deficit during lysis: stop the infusion, emergent CT, notify.
- Nimodipine 60 mg every 4 hours for 21 days, enteral only. Vasospasm peaks days 4 to 14.
- Earliest ICP sign: change in consciousness. Cushing triad is late. NPO until the swallow screen is passed.

Key terms and comparisons: blood pressure targets

Situation	Target	Why
Ischemic stroke, no thrombolytic	Treat only above 220/120; lower about 15% in 24 h	Penumbra flow is pressure dependent
Before thrombolysis	Below 185/110	Higher pressure plus a fibrinolytic raises bleeding risk
24 h after thrombolysis	Below 180/105	Drug still active; tissue freshly reperfused
Intracerebral hemorrhage (SBP 150 to 220)	About 140 (130 to 150); not below 130	Limits hematoma expansion
SAH, aneurysm not secured	Systolic below 160	Rebleeding risk is highest in the first 24 h
SAH with vasospasm, aneurysm secured	Induced hypertension with euvolemia	Now the problem is too little flow

Key terms and comparisons: ICP signs by timing

Timing	Findings	Action
Earliest	Restless, confused, harder to arouse	Full neuro check, glucose, oxygen; notify now
Early	Headache worse with cough, vomiting without nausea	HOB 30, head midline, antiemetic, escalate
Progressing	Sluggish then dilated pupil, worse hemiparesis, decorticate	Emergent CT, hyperosmolar therapy ready, neurosurgery
Late	Cushing triad, decerebrate posturing, fixed dilated pupil	Rapid response, airway, mannitol or hypertonic saline
Hyperosmolar drugs	Mannitol 0.25 to 1 g/kg over 15 to 30 min with a filter; hold if osm above about 320. 3% saline to Na 145 to 155	Draw water out of brain

Worked cases

WORKED CASE 1 · THE PERFUSION ARITHMETIC

Mr. Thorne has an ICP monitor reading 24 mmHg. His blood pressure is 150/78. An hour later it is 96/60 with the same ICP.

STEP 1 · FIND THE MAP

78 plus (150 minus 78)/3 = 78 plus 24 = 102 mmHg.

STEP 2 · FIND THE CPP

102 minus 24 = 78 mmHg, above the 60 to 70 target, but the ICP of 24 is above the 20 to 22 treatment line.

STEP 3 · REPEAT FOR THE NEW PRESSURE

MAP = 60 plus (96 minus 60)/3 = 72. CPP = 72 minus 24 = 48 mmHg.

STEP 4 · INTERPRET

CPP 48 is well below 60. Injured brain cannot autoregulate, so it is now underperfused. Report at once; the team will raise the MAP and lower the ICP.

RULE

Every ICP intervention raises MAP or lowers ICP. Read the equation as a sentence.

WORKED CASE 2 · THE STROKE CLOCK

Mr. Ojukwu, 64, has right arm and face weakness and cannot find his words. His wife saw him well at 1900 and found him like this at 2130. It is now 2210. He weighs 72 kg.

STEP 1 · SET LAST KNOWN WELL

1900, not 2130. From 1900 to 2210 is 3 hours 10 minutes, inside the 4.5 hour window.

STEP 2 · LOCATE THE LESION

Right weakness with aphasia points to the left (dominant) hemisphere, middle cerebral artery territory.

STEP 3 · DO THE FIRST TESTS

Point-of-care glucose and an emergent non-contrast CT to exclude hemorrhage. Do not wait for other labs unless he takes an anticoagulant or has a bleeding history.

STEP 4 · COMPUTE THE DOSE

Alteplase 0.9 x 72 = 64.8 mg total. Bolus 10% = 6.48 mg over 1 minute; the remaining 58.32 mg over 60 minutes. (Worked calculation example only.)

STEP 5 · SET THE PRESSURE

Before the bolus his pressure must be below 185/110, then below 180/105 for 24 hours, with checks every 15 minutes for 2 hours, every 30 minutes for 6 hours, then hourly.

WORKED CASE 3 · TROUBLE DURING THE INFUSION

Twenty minutes into the alteplase infusion, Mr. Ojukwu's tongue begins to swell on one side. Ten minutes later his voice changes. He takes lisinopril at home.

STEP 1 · NAME IT

Orolingual angioedema, more common with ACE inhibitors.

STEP 2 · JUDGE THE AIRWAY

Swelling with a voice change involves more than the front of the tongue. Stop the infusion and call for airway support early.

STEP 3 · EXPECT THE DRUGS

IV methylprednisolone, IV diphenhydramine and famotidine; IM epinephrine if no response. Hold his ACE inhibitor.

CONTRAST

A sudden severe headache, vomiting or new deficit is a different problem: stop the infusion, get an emergent CT for hemorrhage, notify.

TRAPS PEOPLE FALL INTO

- **Lowering the pressure of an untreated ischemic stroke.** Permissive hypertension protects the penumbra. Treat only above 220/120, and gently.
- **Waiting for the Cushing triad to call.** A change in consciousness is the early sign. The triad means herniation is already happening.
- **Giving nimodipine IV.** IV use has caused cardiac arrest and death. Enteral syringe only; check pressure first.
- **Giving a stroke patient water for pills.** NPO until the swallow screen is passed. Silent aspiration is common.
- **Clustering care for a patient with high ICP.** Several stimulating tasks in a row spike pressure. Space them out.

Chapter 3 self-test · ten items

1. A patient has a MAP of 80 mmHg and an ICP of 26 mmHg. How should the nurse read the CPP?

A. 106 mmHg, normal, so keep current care
B. 54 mmHg, below target, so report it now
C. 106 mmHg, above target, so lower the MAP
D. 54 mmHg, within the normal adult target range

B. 54 mmHg, below target, so report it now CPP = MAP minus ICP = 80 minus 26 = 54, below the 60 to 70 target.

2. In a patient at risk for raised intracranial pressure, which change should the nurse expect to see first?

A. Bradycardia with a widening of the pulse pressure
B. A fixed and dilated pupil on the side of the lesion
C. New restlessness, needing louder prompts to wake
D. Decerebrate posturing of all four limbs to pain

C. New restlessness, needing louder prompts to wake Change in level of consciousness comes first. The others are later signs of herniation.

3. A man woke at 0600 with weakness after going to bed well at 2200. What is his last known well time?

A. 2200, the last time he was seen at baseline
B. 0600, when the weakness was first noticed
C. 0400, halfway through the night
D. 0700, when he arrived at the hospital

A. 2200, the last time he was seen at baseline Last known well is the last time the patient was observed normal, not when symptoms were found.

4. Why is a non-contrast CT done before thrombolysis?

A. To check the kidneys before any contrast dye is given
B. To locate the clot so the alteplase dose can be adjusted
C. To confirm the infarct and measure its full size first
D. To exclude bleeding, since early infarcts often look normal

D. To exclude bleeding, since early infarcts often look normal Thrombolysis into a bleed is lethal. Early ischemia is often invisible on CT.

5. An ischemic stroke patient who is not getting a thrombolytic has a pressure of 196/104. What is expected?

A. A nicardipine drip to reach a systolic of 140
B. No antihypertensive unless pressure exceeds 220/120
C. IV labetalol to bring it below 185/110 now
D. Nitroglycerin paste to lower it 25% in an hour

B. No antihypertensive unless pressure exceeds 220/120 Permissive hypertension preserves collateral flow to the penumbra.

6. For a patient with intracerebral hemorrhage and a systolic of 190, what is the target?

A. About 140 mmHg, avoiding a drop below 130
B. Below 185 before any other treatment
C. Below 100 to stop all further bleeding
D. Below 220, then 15% lower over 24 hours

A. About 140 mmHg, avoiding a drop below 130 Lowering toward 140 limits hematoma expansion; too low risks hypoperfusion.

7. A patient on day 7 after subarachnoid hemorrhage becomes inattentive with new arm weakness. What is likely?

A. Side effect of the enteral nimodipine
B. Expected recovery after the first week
C. Rebleeding from the secured aneurysm
D. Vasospasm causing delayed cerebral ischemia

D. Vasospasm causing delayed cerebral ischemia Vasospasm begins around day 3 and peaks days 4 to 14. Notify the provider now.

8. Which action lowers intracranial pressure?

A. Giving D5W to keep the patient well hydrated
B. Clustering all morning care into one session
C. Keeping the head midline with the bed at 30 degrees
D. Flexing the hips fully for patient comfort

C. Keeping the head midline with the bed at 30 degrees Midline head and 30 degrees improve venous outflow. Hypotonic fluid and hip flexion raise ICP.

9. Why is prophylactic hyperventilation no longer routine for high ICP?

A. It requires a paralytic agent that hides the neuro exam
B. It raises CO2 and dilates vessels, raising pressure further
C. It causes metabolic alkalosis that triggers seizures quickly
D. It lowers CO2 and constricts vessels, cutting flow to ischemic brain

D. It lowers CO2 and constricts vessels, cutting flow to ischemic brain The ICP falls because flow falls, which harms ischemic tissue. It is reserved as a brief rescue.

10. Which task may be delegated to assistive personnel for a stable stroke patient?

A. Applying sequential compression devices
B. Scoring the NIHSS at the shift change
C. Doing the bedside swallow screen
D. Teaching the family the BE-FAST signs

A. Applying sequential compression devices Routine care on a stable patient can be delegated. Assessment and teaching stay with the RN.

CHAPTER 4

Neurologic Disorders: Seizures, Headache and CNS Infection

Read it in full: **Chapter 4 in the textbook**. Practice it in the lab: **Status Epilepticus Clock: Five Minutes, Twenty, Forty** and **Meningitis First Hour: Cultures, Steroid, Antibiotic, Then the Tap**.

What to know

A seizure is a burst of synchronous cortical firing when excitation (glutamate) beats inhibition (GABA). A **focal** seizure stays in one region and mimics what that region does; a **generalized** seizure involves both hemispheres from the start and takes consciousness at once. Brief cyanosis is expected because the breathing muscles are clamped. Afterward comes the postictal state. **Todd paralysis** is weakness after a seizure that can last up to 48 hours; it still needs a stroke evaluation.

Epilepsy means two unprovoked seizures more than 24 hours apart (or one with a high recurrence risk). A single provoked seizure from low glucose, low sodium or alcohol withdrawal is not epilepsy.

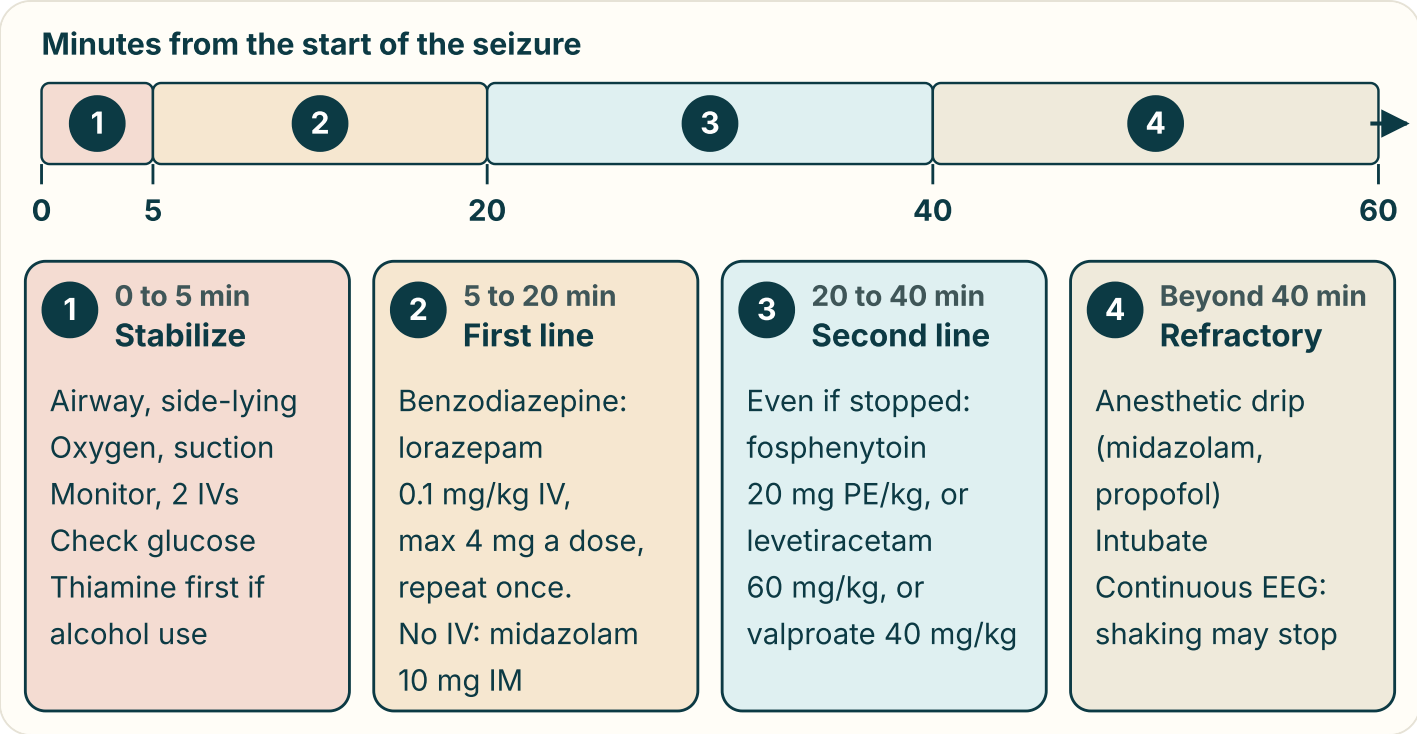
During a seizure: note the time, stay, call for help, lower the bed, turn the patient to the side, protect the head, give oxygen, have suction ready. **Never restrain and never put anything in the mouth.** Afterward chart what you saw: onset, where it started and spread, eye deviation, awareness, automatisms, color, incontinence, injury, postictal state, vital signs and glucose. Check glucose first in every first seizure. In pregnancy after 20 weeks, a seizure is eclampsia until proven otherwise and the drug is magnesium sulfate.

Status epilepticus is 5 minutes or more of seizing, or repeated seizures without recovery between. The algorithm is timed. 0 to 5 minutes: airway, oxygen, monitor, IV access, glucose (thiamine before glucose in alcohol use disorder). 5 to 20 minutes: lorazepam 0.1 mg/kg IV (maximum 4 mg per dose, repeat once) or midazolam 10 mg IM. 20 to 40 minutes: a second-line drug even if the seizure stopped: fosphenytoin 20 mg PE/kg (no faster than 150 mg PE/min), levetiracetam 60 mg/kg or valproate 40 mg/kg. Beyond 40 minutes: anesthetic infusions, intubation, continuous EEG. Phenytoin goes in normal saline only, no faster than 50 mg/min (25 in older or cardiac patients).

Migraine: unilateral, pulsating, 4 to 72 hours, nausea, light and sound sensitivity; the patient lies still. Tension-type: bilateral band, mild, keeps working. Cluster: strictly one-sided orbital pain for 15 to 180 minutes with tearing, congestion, ptosis and miosis; the patient paces; treat with oxygen 12 to 15 L/min by non-rebreather plus subcutaneous sumatriptan. Triptans are contraindicated in coronary disease, uncontrolled hypertension and stroke. Screen with **SNOOP**: a thunderclap headache is subarachnoid hemorrhage until proven otherwise; a new headache after 50 with jaw claudication is giant cell arteritis, and steroids start **before** the biopsy.

Bacterial meningitis is decided in the first hour. The order is **blood cultures, dexamethasone, antibiotics, then CT and lumbar puncture**; the tap never delays the drug. Dexamethasone 0.15 mg/kg goes 10 to 20 minutes before or with the first antibiotic. Adults get vancomycin plus ceftriaxone, adding ampicillin for Listeria if over 50, pregnant or immunocompromised. Bacterial CSF is cloudy with high neutrophils, high protein and low glucose; viral CSF is clear with

lymphocytes and normal glucose. Start **droplet precautions** on suspicion and keep them 24 hours into effective therapy; close contacts of meningococcal disease need prophylaxis within 24 hours. In encephalitis, start IV acyclovir before the HSV PCR returns and hydrate to protect the kidneys.



Five minutes makes it status. Each phase has a job and a deadline. A benzodiazepine that works at minute 4 may fail at minute 40, because its receptors are pulled inside the neuron as the seizure runs.

LOCK THESE IN

- During a seizure: time it, side-lying, protect the head, oxygen and suction. No restraint, nothing in the mouth.
- Glucose first in every seizure workup. Thiamine before glucose in alcohol use disorder.
- Status epilepticus: 5 minutes. Lorazepam 0.1 mg/kg (max 4 mg), then a second-line agent even if seizing stopped.
- Phenytoin: saline only, 50 mg/min maximum (25 in elders or heart disease), filter, monitor. Level 10 to 20 mcg/mL.
- Never stop an antiseizure drug abruptly. Any rash on lamotrigine or carbamazepine: hold and call.
- Thunderclap headache: SAH until proven otherwise; no triptan. Giant cell arteritis: steroids before biopsy.
- Meningitis: cultures, dexamethasone, antibiotics, then CT and LP. Ampicillin for Listeria if over 50.
- Droplet precautions on suspicion; contacts get prophylaxis within 24 hours. Acyclovir before the PCR.

Key terms and comparisons: antiseizure drugs

Drug	Level or monitoring	Signature toxicity and teaching
Phenytoin	Total 10 to 20 mcg/mL; free 1 to 2	Nystagmus near 20, ataxia above 30; gum overgrowth (oral care); enzyme inducer; teratogenic
Carbamazepine	4 to 12 mcg/mL; sodium; CBC	Hyponatremia (SIADH), agranulocytosis; SJS linked to HLA-B*15:02; no grapefruit
Valproate	50 to 100 mcg/mL; LFTs; ammonia	Liver injury, pancreatitis, high ammonia, low platelets; neural tube defects
Levetiracetam	Not routinely monitored	Irritability, aggression, depression; reduce dose in kidney disease
Lamotrigine	Not routinely monitored	Serious rash; titrate slowly; valproate doubles its level
Topiramate	Not routinely monitored	Word-finding trouble, kidney stones (fluids), acute angle-closure glaucoma

Key terms and comparisons: reading cerebrospinal fluid

Parameter	Normal	Bacterial	Viral
Appearance	Clear	Cloudy, turbid	Clear
Opening pressure	6 to 20 cm H2O	Often above 30	Normal or mildly raised
White cells	0 to 5 per mm3	1000 to 5000, neutrophils above 80%	50 to 1000, lymphocytes
Protein	15 to 45 mg/dL	100 to 500	Normal to about 100
Glucose	45 to 80 mg/dL; CSF:serum 0.6 or higher	Below 40; ratio below 0.4	Normal

Worked cases

WORKED CASE 1 · THE SEIZURE THAT WILL NOT STOP

Mrs. Lindqvist, 58, with epilepsy on levetiracetam, had her doses held since midnight for a procedure. At 1012 she starts a generalized tonic-clonic seizure. She weighs 70 kg. Worked calculation example only.

STEP 1 · STABILIZE FROM 0 TO 5 MINUTES

Side-lying, oxygen by non-rebreather, suction, monitor, two IVs, capillary glucose (it is 96).

STEP 2 · CALL IT STATUS AT 1017

Five minutes of continuous seizing is status epilepticus. Escalate with SBAR.

STEP 3 · FIRST-LINE DOSE

Lorazepam 0.1 mg/kg x 70 = 7 mg, but the maximum is 4 mg per dose. Give 4 mg IV; repeat once in 3 to 5 minutes if seizing continues.

STEP 4 · SECOND-LINE DOSE

Even if she stops: levetiracetam 60 x 70 = 4200 mg (under the 4500 mg cap), or fosphenytoin 20 x 70 = 1400 mg PE at no more than 150 mg PE/min, so at least about 9.3 minutes, with cardiac monitoring.

STEP 5 · FIND THE CAUSE

Held doses were the trigger. Make sure future NPO orders include an IV equivalent.

WORKED CASE 2 · A PHENYTOIN ORDER WITH TWO ERRORS

Pharmacy sends phenytoin 1 g in 100 mL of dextrose 5%, labeled to run over 10 minutes, for Mr. Bhatt, 76.

STEP 1 · CHECK THE DILUENT

Phenytoin precipitates in dextrose. It must be in normal saline.

STEP 2 · CHECK THE RATE

1000 mg over 10 minutes = 100 mg/min. The adult maximum is 50 mg/min, and 25 mg/min for older adults.

STEP 3 · COMPUTE A SAFE TIME

At 25 mg/min, 1000 mg takes at least 40 minutes.

STEP 4 · ACT

Hold, call pharmacy and the prescriber, use a filter and cardiac monitoring when it is corrected.

WORKED CASE 3 · THE FIRST HOUR OF MENINGITIS

Ms. Haddad, 19, a college student, has fever of 39.6 C, severe headache, a stiff neck and a few petechiae on her legs. She weighs 70 kg.

STEP 1 · ISOLATE

Droplet precautions now, before any result. Mask on entry; mask her for transport.

STEP 2 · CULTURES

Draw two sets of blood cultures before antibiotics.

STEP 3 · DEXAMETHASONE

0.15 mg/kg x 70 = 10.5 mg IV, 10 to 20 minutes before or with the first antibiotic.

STEP 4 · ANTIBIOTICS

Vancomycin plus ceftriaxone now. No ampicillin needed: she is under 50, not pregnant and not immunocompromised.

STEP 5 · THEN IMAGING AND TAP

CT before LP only for herniation risk. Mark and time the edge of the rash: rapid spread means fulminant disease.

STEP 6 · CONTACTS

Her roommate needs prophylaxis within 24 hours (ciprofloxacin, rifampin or ceftriaxone).

TRAPS PEOPLE FALL INTO

- **Putting a padded tongue blade in the mouth.** Nothing goes in the mouth during a seizure. The tongue cannot be swallowed.
- **Stopping after the benzodiazepine.** A second-line agent is given even when the shaking has stopped.
- **Getting the lumbar puncture first.** Cultures, dexamethasone and antibiotics come first. The tap never delays the drug.
- **Calling a new headache after 50 a migraine.** Think giant cell arteritis, subdural hematoma and mass. Primary headache rarely starts after 50.
- **Waiting for the HSV PCR before acyclovir.** Start acyclovir on suspicion; every hour of delay costs brain function.

Chapter 4 self-test · ten items

1. A patient begins a tonic-clonic seizure in bed. What is the nurse's first action?

A. Insert an oral airway to protect her tongue from biting
B. Hold her arms and legs firmly to prevent any injury
C. Note the time, call for help and turn her to the side
D. Leave briefly to bring the suction machine from the hall

C. Note the time, call for help and turn her to the side Time it, stay, protect. Never restrain and never put anything in the mouth.

2. Which statement best describes Todd paralysis?

A. A sign of a new stroke that rules out any seizure
B. Weakness after a seizure that still needs a stroke workup
C. Permanent weakness caused by many repeated seizures
D. A side effect of IV lorazepam that was pushed too fast

B. Weakness after a seizure that still needs a stroke workup Todd paralysis resolves within minutes to 48 hours but mimics stroke, so stroke must be excluded.

3. A patient has seized continuously for 6 minutes. What drug is expected first?

A. Oral phenytoin loading dose by nasogastric tube
B. IV magnesium sulfate as a slow loading dose
C. IV levetiracetam 60 mg/kg over 10 minutes
D. IV lorazepam 0.1 mg/kg up to 4 mg per dose

D. IV lorazepam 0.1 mg/kg up to 4 mg per dose Benzodiazepine first. Levetiracetam is second line. Magnesium is for eclampsia.

4. After lorazepam the seizure stops. What should the nurse anticipate next?

A. A second-line drug such as fosphenytoin or levetiracetam
B. No further drug, since the seizure has already ended
C. Discharge teaching as soon as the patient is awake
D. A repeat lorazepam dose every hour through the night

A. A second-line drug such as fosphenytoin or levetiracetam Second-line therapy prevents recurrence and is given even if convulsions stopped.

5. Which teaching point fits phenytoin?

A. Expect orange urine, sweat and tears for a week
B. See the dentist often and brush carefully every day
C. Have your sodium checked for low levels often
D. Avoid all sun exposure because of skin cancer

B. See the dentist often and brush carefully every day Phenytoin causes gingival hyperplasia. Low sodium fits carbamazepine; orange fluids fit rifampin.

6. A patient on lamotrigine for two weeks reports a rash and mouth sores. What is best?

A. Hold the next dose and notify the prescriber now
B. Halve the dose and apply a steroid cream
C. Continue the drug, as early rashes are expected
D. Give diphenhydramine and recheck in the morning

A. Hold the next dose and notify the prescriber now Rash with mucosal sores may be Stevens-Johnson syndrome. Stop and report.

7. A 36-year-old with coronary stents requests sumatriptan for migraine. What should the nurse do?

A. Give it, since a single dose is safe for most people
B. Give it with a full glass of water and a small snack
C. Withhold it and ask for a drug that does not constrict vessels
D. Give half the dose and recheck the heart rate in an hour

C. Withhold it and ask for a drug that does not constrict vessels Triptans vasoconstrict and are contraindicated in coronary disease. Gepants or lasmiditan do not.

8. A 70-year-old has a new headache, scalp tenderness and jaw pain with chewing. What comes first?

A. Reassurance and a headache diary for 2 weeks
B. A temporal artery biopsy before any steroid
C. A triptan trial to rule out a migraine attack
D. Steroids started before the temporal artery biopsy

D. Steroids started before the temporal artery biopsy Giant cell arteritis can cause permanent blindness. Steroids are not delayed for biopsy.

9. CSF is cloudy with 2800 white cells (mostly neutrophils), protein 240 and glucose 20. What does this show?

A. Normal spinal fluid
B. Viral meningitis
C. Tension-type headache
D. Bacterial meningitis

D. Bacterial meningitis Neutrophils, high protein and low glucose are the bacterial pattern.

10. A 74-year-old has suspected bacterial meningitis. Which drug is added to vancomycin and ceftriaxone?

A. Ampicillin, to cover Listeria
B. Metronidazole, to cover Listeria
C. Acyclovir, to cover Listeria
D. Fluconazole, to cover Listeria

A. Ampicillin, to cover Listeria Over age 50, Listeria is a risk, and cephalosporins do not cover it.

ONE PAGE

Cram sheet

One page of clocks, targets and doses for both chapters. Cover the right column and say each rule out loud.

Stroke and ICP

Item	Rule or value
Perfusion	MAP = diastolic plus one third of pulse pressure; CPP = MAP minus ICP; target 60 to 70; ICP normal 5 to 15, treat above 20 to 22
GCS	Eyes 4, verbal 5, motor 6; 13 to 15 mild, 9 to 12 moderate, 8 or less severe
Thrombolysis	Within 4.5 h of last known well; alteplase 0.9 mg/kg (max 90), 10% bolus; tenecteplase 0.25 mg/kg (max 25)
Checks after lysis	Every 15 min for 2 h, every 30 min for 6 h, hourly to 24 h; no antithrombotic for 24 h
BP targets	Before lysis below 185/110; after below 180/105; no lysis treat above 220/120; ICH about 140; SAH below 160
Thrombectomy	Large-vessel occlusion; within 6 h, selected out to 24 h
SAH	Nimodipine 60 mg enteral every 4 h for 21 days; vasospasm days 4 to 14; no fluid restriction
ICP care	HOB 30, midline, no Valsalva, suction 10 s or less, space care, isotonic fluid, CO2 35 to 45
Mannitol	0.25 to 1 g/kg over 15 to 30 min, filter, hold if osm above about 320
Swallow	NPO until screen passed; upright 90 degrees for meals and 30 min after

Seizures, headache and CNS infection

Item	Rule or value
Status epilepticus	5 minutes; lorazepam 0.1 mg/kg (max 4) or midazolam 10 mg IM; then fosphenytoin 20 mg PE/kg, levetiracetam 60 mg/kg or valproate 40 mg/kg
Phenytoin	Saline only, 50 mg/min max (25 in elders); level 10 to 20 mcg/mL
Seizure precautions	Bed low, rails padded, suction and oxygen at bedside, IV access, no oral thermometer
Cluster headache	Oxygen 12 to 15 L/min non-rebreather 15 to 20 min plus SC sumatriptan 6 mg
Triptan no	Coronary disease, uncontrolled hypertension, stroke, ergot within 24 h
SNOOP	Systemic, Neurologic, Onset sudden, Older than 50, Pattern change and more
Meningitis order	Cultures, dexamethasone 0.15 mg/kg, vancomycin plus ceftriaxone (plus ampicillin if over 50), then CT and LP
Droplet	On suspicion until 24 h of effective antibiotics; contact prophylaxis within 24 h
Encephalitis	Acyclovir 10 mg/kg every 8 h before PCR; hydrate, watch creatinine

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