

[HOSPITAL / HEALTH AUTHORITY NAME]

ACUTE SEVERE HEADACHE, MENINGISM, AND SUSPECTED INTRACRANIAL EMERGENCY PATHWAY

Protocol 20: Rapid Recognition, Neuroimaging, Infection Treatment, Intracranial-Pressure Rescue, Transfer, and Safe Disposition

DRAFT FOR EMERGENCY MEDICINE, INTERNAL MEDICINE, NEUROLOGY, NEUROSURGERY, ANAESTHESIA, CRITICAL CARE, INFECTIOUS DISEASES, PAEDIATRICS, OBSTETRICS, OPHTHALMOLOGY, PHARMACY, LABORATORY, RADIOLOGY, EMS, TRANSFER, INFECTION PREVENTION, AND CLINICAL-GOVERNANCE REVIEW

IMMEDIATE SAFETY RULE: Treat thunderclap headache, headache with fever or meningism, new focal deficit, seizure, altered consciousness, papilloedema, abnormal pupils, pregnancy/postpartum onset, severe hypertension with neurological symptoms, anticoagulant use, or rapid deterioration as a possible intracranial emergency. Stabilize first; activate urgent imaging and specialist pathways; and never delay time-critical antibiotics, antivirals, anticoagulant reversal, seizure treatment, or herniation rescue solely to obtain CT, lumbar puncture, MRI, or transfer acceptance.

STATUS: This is a draft clinical-governance document. Exact imaging availability, CT interpretation standards, lumbar-puncture competency, laboratory tests, isolation precautions, antimicrobial and antiviral regimens, dexamethasone use, blood-pressure targets, anticoagulant reversal, hyperosmolar therapy, nimodipine, transfer destinations, and paediatric, pregnancy, renal, and immunocompromised adjustments must be approved locally before implementation. Staff must verify every medicine against the locally approved formulary and product information.

Document control	Details
Document owner	Emergency Department / Medical Services Directorate / Nursing Services / Clinical Governance
Clinical leads	Emergency Medicine; Internal Medicine; Neurology; Neurosurgery / receiving neurovascular service; Anaesthesia / Critical Care; Infectious Diseases / Microbiology; Paediatrics
Supporting departments	Obstetrics; Ophthalmology; Pharmacy; Laboratory; Radiology; Infection Prevention and Control; EMS; Patient Transport / Transfer Coordination
Applies to	All staff involved in recognition, triage, stabilization, investigation, treatment, monitoring, consultation, transfer, admission, discharge, and follow-up of patients with acute severe headache, meningism, or suspected intracranial emergency
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Related protocols	Protocols 1-19; altered mental status; stroke/TIA; seizures/status; sepsis; airway management; major haemorrhage and anticoagulant reversal; hypertensive emergency; pregnancy emergencies; toxicology; paediatric emergency; infection prevention; transfer and observation protocols

1. Purpose

To provide a continuous emergency-department pathway from first contact through disposition for patients with acute severe headache, meningism, suspected central nervous system infection, or another intracranial emergency. The protocol prioritizes early recognition of life-threatening secondary headache, rapid stabilization, appropriate neuroimaging and lumbar puncture, immediate cause-directed treatment, prevention of neurological deterioration, and reliable admission or transfer.

2. Scope

This protocol applies to adults, adolescents, children older than the neonatal period, pregnant and postpartum patients, older adults, immunocompromised patients, and people receiving antiplatelet or anticoagulant therapy. Neonates, major trauma, known

acute stroke, isolated uncomplicated recurrent primary headache, and confirmed toxicological syndromes should also activate the relevant linked pathway while this protocol addresses the headache or meningism component.

3. Core policy statements

- No patient with a first or worst severe headache, thunderclap onset, meningism, fever, focal neurological change, seizure, altered consciousness, papilloedema, abnormal pupils, or pregnancy/postpartum red flag shall be assigned a low-acuity pathway without clinician assessment.
- ABCDE stabilization, bedside glucose, neurological trend, pain relief, and time-critical treatment occur in parallel; diagnostic testing must not create avoidable treatment delay.
- The exact onset, time to maximal intensity, last-known-well time, fever/sepsis timeline, and all pre-arrival medicines shall be documented.
- A normal initial neurological examination does not exclude subarachnoid haemorrhage, cerebral venous thrombosis, meningitis, cervical artery dissection, pituitary apoplexy, reversible cerebral vasoconstriction syndrome, or posterior reversible encephalopathy syndrome.
- Non-contrast head CT is the first-line test for most thunderclap or rapidly progressive severe headaches; CTA, CTV, MRI, MRA, MRV, lumbar puncture, or ophthalmic testing is selected according to the suspected diagnosis and timing.
- When bacterial meningitis is suspected, obtain blood cultures and perform lumbar puncture first only when safe and when this will not materially delay antibiotics; give IV antibiotics within 1 hour of hospital arrival.
- When encephalitis is reasonably suspected, start locally approved IV acyclovir promptly after blood sampling and do not wait for CSF PCR, MRI, or specialist review.
- Lumbar puncture is never performed in an unstable patient or when there are unresolved signs suggesting mass effect or raised intracranial pressure; imaging does not replace clinical stabilization.
- Intracranial haemorrhage, herniation, confirmed aneurysmal subarachnoid haemorrhage, severe cerebral venous thrombosis, brain abscess, and other neurosurgical emergencies require early receiving-centre contact and transfer planning.
- Primary headache treatment and discharge are appropriate only after dangerous secondary causes have been reasonably excluded, symptoms are controlled, neurological status is safe, and explicit follow-up and return precautions are provided.

4. Definitions

Term	Operational definition
Thunderclap headache	Severe headache that reaches maximal intensity instantly or within 60 minutes. It is a syndrome requiring evaluation for subarachnoid haemorrhage and other vascular or intracranial causes.
Meningism	Neck stiffness or pain with headache and associated features suggesting meningeal irritation. Absence of neck stiffness does not exclude meningitis or subarachnoid haemorrhage.
Suspected bacterial meningitis	Compatible clinical illness such as fever, headache, neck stiffness, altered mental state, seizures, focal signs, or a non-blanching rash where bacterial meningitis remains a plausible diagnosis.
Suspected encephalitis	Altered mental status or behaviour lasting beyond a brief postictal period, usually with fever, seizures, focal findings, or CSF/MRI evidence of brain inflammation.
Raised intracranial pressure	Clinical or radiological evidence of impaired intracranial compliance, including progressive reduced consciousness, abnormal pupils, posturing, papilloedema, vomiting, severe hypertension with bradycardia, or mass effect.
Sentinel headache	A sudden unusual headache that may precede aneurysmal subarachnoid haemorrhage. It must not be dismissed as migraine solely because symptoms improve.
Primary headache	Migraine, tension-type headache, cluster headache, or another primary disorder diagnosed only after the presentation is compatible and dangerous secondary causes have been assessed.
Secondary headache	Headache caused by another disorder, including haemorrhage, infection, vascular disease, intracranial pressure disorder, ocular disease, pregnancy-related disease, toxic exposure, or systemic inflammation.

5. Roles and accountability

Role	Minimum responsibility
Triage / first-contact nurse	Recognize red flags; assign acuity; record onset and time to peak; obtain observations and glucose; initiate isolation when indicated; place in a monitored area; and alert the responsible clinician immediately.
ED clinician / team leader	Direct ABCDE stabilization, neurological assessment, diagnostic strategy, analgesia, antimicrobial/antiviral or haemorrhage treatment, consultation, reassessment, and disposition. Name the owner and deadline for each next action.
Resuscitation nurse	Establish monitoring and access, administer time-critical medicines using independent checks, record times, obtain cultures and specimens, perform serial observations, and escalate change immediately.
Radiology	Prioritize emergency CT/CTA/CTV or MRI/MRA/MRV; communicate critical findings directly; document interpretation time; and activate a downtime or transfer pathway when local imaging is unavailable.
Laboratory / microbiology	Prioritize cultures, blood tests, CSF cell count/protein/glucose, microscopy, culture, and PCR; communicate critical results directly; retain residual CSF where appropriate.
Neurology / neurosurgery / neurovascular service	Support diagnosis and definitive management of haemorrhage, vascular disease, raised pressure, refractory seizures, and uncertain focal syndromes; advise transfer and monitoring.
Infectious diseases / microbiology	Advise empiric and targeted antimicrobial/antiviral therapy, resistance and epidemiology, isolation, public-health action, and immunocompromised presentations.
Anaesthesia / critical care	Lead airway, ventilation, haemodynamic support, herniation rescue, invasive monitoring, sedation, and critical-care transfer.
Paediatrics / obstetrics / ophthalmology	Lead age-, pregnancy-, postpartum-, fetal-, visual-, glaucoma-, and giant-cell-arteritis-specific assessment and treatment.
EMS / transfer team	Continue neurological and physiological monitoring, carry rescue medicines and airway equipment, communicate deterioration, and provide direct receiving-team handover.

6. Pathway activation and triage

Category	Operational criteria
RED / immediate resuscitation	Thunderclap headache with collapse, focal deficit, seizure, GCS reduction, abnormal pupils, shock, severe hypoxaemia, repeated vomiting with deterioration, meningococcal-type rash, severe sepsis, suspected herniation, acute visual loss with neurological features, pregnancy/postpartum neurological emergency, or major anticoagulant-associated concern.
ORANGE / very urgent	First or worst severe headache; new meningism or fever; persistent vomiting; papilloedema; new headache after age 50; cancer/immunocompromise; anticoagulant use; postpartum headache; severe hypertension with symptoms; atypical or prolonged aura; painful Horner syndrome; or headache that is progressive, exertional, positional, triggered by cough/Valsalva, or different from usual.
YELLOW / urgent	Clinically stable patient with recurrent known migraine or another likely primary headache but incomplete symptom control, diagnostic uncertainty, dehydration, or need for clinician assessment before discharge.
GREEN / routine	Only after clinician confirmation of a familiar uncomplicated primary-headache pattern, normal examination, no red flags, reliable follow-up, and no concern for secondary cause. First severe headache and thunderclap headache are never green.

DO NOT MISS: Improvement after analgesia, a normal initial GCS, lack of neck stiffness, absence of fever, or a history of migraine does not by itself exclude subarachnoid haemorrhage, meningitis, cerebral venous thrombosis, dissection, pituitary apoplexy, or another dangerous secondary cause.

7. First 10 minutes: danger recognition and parallel action

Action	Required practice
Call and locate	Move high-risk patients to resuscitation or monitored care. Call senior ED help and activate stroke, sepsis, neurosurgical, obstetric, paediatric, or airway support as indicated.
Time and witness	Record exact onset, last known well, time to maximal intensity, collapse or seizure time, fever duration, postpartum interval, anticoagulant dose/time, and pre-arrival treatment. Obtain collateral history.
Monitor and access	Continuous pulse oximetry and ECG for unstable/high-risk patients; frequent BP and neurological observations; IV access, with a second line when sepsis, haemorrhage, or rapid deterioration is possible.
Immediate tests	Bedside glucose; pregnancy test when relevant; ECG when syncope, toxic exposure, severe hypertension, or QT-active medicines are relevant; urgent blood tests and cultures as indicated.
Infection actions	Apply droplet precautions for suspected meningococcal disease according to local policy. Obtain cultures rapidly. Give empiric antibiotics within 1 hour; add acyclovir when encephalitis is possible. Do not wait for CT or LP when delay would be clinically important.
Haemorrhage actions	Stop anticoagulants, obtain reversal information, activate urgent non-contrast CT and vascular imaging, control extreme BP without causing hypotension, treat seizures, and call the receiving neurovascular/neurosurgical service.
Herniation actions	Airway-skilled and critical-care clinicians to bedside; head elevation, neutral neck, oxygenation and ventilation, avoidance of hypotension, hyperosmolar rescue per approved protocol, and immediate definitive imaging/transfer.
Pain and distress	Provide timely non-opioid analgesia and antiemetic therapy when safe. Analgesia must not be withheld to preserve diagnostic findings; serial examination remains mandatory.

8. Immediate stabilization: ABCDE

8.1 Airway and breathing

- Use airway manoeuvres, suction, adjuncts, oxygen for hypoxaemia, and bag-mask ventilation for inadequate breathing. Call an airway-skilled clinician early for GCS decline, repeated seizures, aspiration, severe agitation requiring sedation, or anticipated transfer.
- Avoid hypoxaemia and sustained hypercapnia. After intubation, confirm tube position with waveform capnography and use ventilation targets appropriate to the neurological condition.
- Routine hyperventilation is harmful. Brief controlled hyperventilation may be used only as a bridge in impending herniation while definitive treatment is being arranged.

8.2 Circulation and blood pressure

- Treat shock promptly and seek its cause. Avoid hypotension in intracranial haemorrhage, raised pressure, meningitis, and sepsis because it worsens cerebral perfusion.
- When severe hypertension accompanies haemorrhage, PRES, eclampsia, or another end-organ emergency, use titratable IV treatment and a locally approved target. Avoid abrupt or excessive reductions.
- Obtain anticoagulant and antiplatelet details, last dose, renal function, and indication. Activate the approved reversal pathway immediately for clinically important intracranial haemorrhage.

8.3 Disability

- Document GCS components, pupils, visual fields/acuity when feasible, gaze, speech, facial and limb function, coordination, meningism, and behavioural state. Repeat after any change or intervention.
- Check glucose immediately. Treat hypoglycaemia, seizures, hyperthermia, and severe electrolyte abnormalities without delaying neuroimaging or infection therapy.
- Use a stroke scale when focal deficit is present and activate Protocol 18. A headache pathway must not delay reperfusion evaluation in an eligible ischaemic stroke.

8.4 Exposure and environment

- Inspect for rash, petechiae/purpura, head or neck trauma, mastoid or sinus infection, dental sepsis, shingles, injection marks, dehydration, pregnancy, postpartum bleeding, and toxic exposure.
- Check temperature and protect privacy. Use infection precautions based on the suspected organism and local policy. Consider carbon monoxide when multiple people from the same location have headache or altered symptoms.

9. Rapid syndrome classification

Presentation pattern	Priority diagnoses and actions
Thunderclap / maximal within 1 hour	Subarachnoid haemorrhage, RCVS, cervical artery dissection, CVT, pituitary apoplexy, intracerebral haemorrhage. Urgent non-contrast CT; add CTA/CTV/MRI according to pattern and timing.
Fever, headache, meningism, rash, or altered behaviour	Bacterial meningitis, meningococcal disease, viral encephalitis, brain abscess, sepsis. Cultures, antibiotics within 1 hour, acyclovir when indicated, safe LP or imaging pathway, isolation.
Headache plus focal deficit, aphasia, ataxia, or seizure	Ischaemic/haemorrhagic stroke, CVT, dissection, mass lesion, abscess, encephalitis, PRES. Activate stroke and urgent imaging pathways.
Headache plus progressive reduced consciousness or abnormal pupils	Raised ICP, hydrocephalus, mass effect, haemorrhage, infection, toxic/metabolic cause. Herniation precautions, critical care, urgent imaging and neurosurgical consultation.
Pregnancy or up to 6 weeks postpartum	Preeclampsia/eclampsia, PRES, CVT, pituitary apoplexy, arterial dissection, SAH. BP, urine protein and obstetric review; do not withhold necessary imaging.
Visual loss, painful red eye, ophthalmoplegia, or temporal tenderness	Acute angle-closure glaucoma, pituitary apoplexy, cavernous sinus thrombosis, optic neuritis, giant cell arteritis. Measure visual function and pressure when competent; urgent specialty care.
Positional or Valsalva-related headache	Intracranial hypotension, raised ICP, mass lesion, Chiari-related disease, CVT. Imaging strategy based on direction, context, and examination.
Likely recurrent primary headache	Treat only after red-flag review, normal neurological assessment, and reasonable exclusion of secondary causes. Prefer non-opioid therapy.

10. Focused history and collateral information

- Onset: exact time, sudden versus progressive, time to peak, activity/exertion/sex/cough/Valsalva, neck movement or trauma, awakening from sleep, and whether this is first, worst, or different from usual.
- Associated features: fever, rash, photophobia, vomiting, neck stiffness, collapse, seizure, confusion, weakness, sensory change, speech/vision change, vertigo, gait difficulty, jaw claudication, scalp tenderness, eye pain/redness, and hearing change.
- Risk context: pregnancy/postpartum interval, oral contraception or hormones, malignancy, immunosuppression/HIV, recent infection or procedure, sinus/ear/dental disease, dehydration, thrombophilia, hypertension, recent lumbar puncture/neuraxial procedure, and head/neck trauma.
- Medicines/substances: anticoagulants, antiplatelets, immunosuppressants, antibiotics, vasoactive or serotonergic medicines, triptans/ergots, stimulants, cocaine/amphetamines, alcohol or sedative withdrawal, and carbon monoxide exposure.
- Previous headache diagnosis, typical pattern and aura, prior imaging or aneurysm, family history of aneurysm/SAH, known cancer, prior thrombosis, recent vaccination when relevant, and baseline neurological/functional status.
- For reduced consciousness or communication difficulty, obtain history from family, witnesses, EMS, carers, records, and medication containers. Document the source and reliability.

11. Focused examination

Domain	Minimum examination
General / physiology	Airway, respiratory pattern, oxygenation, pulse, BP in appropriate cuff, temperature, hydration, sepsis signs, rash, trauma, pregnancy/postpartum state, and toxic features.
Mental state	GCS components, orientation, attention, language, behaviour, memory, and trend. Distinguish postictal recovery from persistent encephalopathy.

Domain	Minimum examination
Cranial nerves / eyes	Pupils, visual acuity and fields when possible, fundus/papilloedema if competent and safe, eye movements, ptosis, facial sensation/strength, hearing, palate and tongue.
Motor / sensory	Tone, power, pronator drift, reflexes when relevant, plantar response, sensation, neglect, and symmetry.
Coordination / gait	Finger-nose, heel-shin, truncal stability, and gait only when safe. Inability to walk is a neurological red flag.
Meningeal / infectious	Neck movement, photophobia, rash, ENT/dental/mastoid source, spinal tenderness, and signs of endocarditis. Do not force neck flexion in severe pain or possible cervical injury.
Vascular / inflammatory	Carotid or vertebral dissection clues, Horner syndrome, pulse asymmetry, temporal artery tenderness or reduced pulse, severe hypertension, and pregnancy-related features.
Ophthalmic	Redness, corneal clouding, fixed mid-dilated pupil, visual loss, ocular pressure where trained, and pain with eye movement. Do not attribute ocular emergencies to migraine.

12. Diagnostic strategy: choose the test for the suspected danger

Clinical question	Preferred initial approach
Is there acute blood or major mass effect?	Non-contrast CT head urgently. Do not delay stabilization or time-critical treatment.
Is aneurysmal SAH still possible?	CT timing and quality matter. If CT is negative and clinically important risk remains, use LP or CTA according to the local pathway, patient factors, and shared decision-making; consult radiology/neurology when uncertain.
Is there arterial occlusion, aneurysm, dissection, or RCVS?	CTA head/neck or MRA based on urgency, renal/contrast factors, and availability. A normal early vascular study may not exclude evolving RCVS.
Is there CVT?	CTV or MRV. A routine non-contrast CT may be normal or nonspecific.
Is there meningitis or encephalitis?	Blood cultures and immediate treatment; LP when safe. CT first only for clinical risk of mass effect/raised pressure, not routinely.
Is there abscess, posterior fossa disease, pituitary lesion, PRES, or inflammatory disease?	MRI with appropriate sequences/contrast where feasible; use CT for urgent stabilization and transfer decisions when MRI is unavailable.
Is there acute angle-closure glaucoma or giant cell arteritis?	Ophthalmic examination/tonometry or inflammatory markers and urgent specialty treatment. Brain imaging alone does not exclude these diagnoses.
Is there toxic or systemic disease?	Targeted tests such as co-oximetry, toxicology, renal/liver tests, inflammatory markers, infection work-up, or endocrine testing, guided by history and physiology.

13. Suspected subarachnoid haemorrhage pathway

- Suspect SAH in thunderclap headache, exertional or sexual-onset headache, collapse/syncope, meningism, vomiting, seizure, focal deficit, painful third-nerve palsy, or an unusual severe headache in a patient with aneurysm/family history.
- Obtain urgent non-contrast CT interpreted by an appropriately qualified reader. CT sensitivity is highest early and depends on scanner quality, technique, haemoglobin, and interpretation.
- For alert neurologically intact adults scanned within 6 hours on an adequate scanner, a normal CT may be sufficient under an approved pathway. Outside this setting, or when important clinical concern remains, perform LP or CTA rather than declaring SAH excluded.
- If LP is used for SAH, follow the approved timing, opening-pressure, tube-number, cell-count, xanthochromia, and laboratory-interpretation pathway. A traumatic tap requires careful interpretation and may require vascular imaging.
- When SAH is confirmed or strongly suspected: minimize exertion; provide analgesia/antiemesis; avoid hypotension; use titratable BP treatment for severe hypertension; reverse clinically important anticoagulation; treat seizures; keep nil by mouth until swallow/definitive plan; and contact the neurovascular/neurosurgical receiving centre immediately.
- Arrange definitive aneurysm assessment and treatment at an experienced centre. Early enteral nimodipine is beneficial after aneurysmal SAH when approved and haemodynamically tolerated; do not delay transfer to start it.

- Do not give routine prophylactic hypervolaemia, IV magnesium, or statins solely for SAH. Avoid routine antifibrinolytic therapy unless specifically directed by the receiving specialist under a defined system.

TRANSFER RULE: A patient with confirmed or highly suspected aneurysmal SAH remains at risk of rebleeding and abrupt deterioration. Acceptance, transport mode, escort capability, BP/airway plan, imaging transfer, and contingency treatment must be arranged without avoidable delay.

14. Intracerebral haemorrhage and other acute vascular emergencies

Condition	Immediate ED priorities
Intracerebral / intraventricular haemorrhage	ABC, urgent CT/CTA as indicated, BP management using the haemorrhagic-stroke pathway, anticoagulant reversal, seizure treatment, hydrocephalus/mass-effect assessment, neurosurgical and critical-care consultation.
Cervical artery dissection	Consider after neck trauma/manipulation or spontaneous neck/head pain with focal deficit, partial Horner syndrome, cranial neuropathy, or posterior circulation symptoms. CTA/MRA head and neck; activate stroke pathway; avoid neck manipulation.
RCVS	Recurrent thunderclap headaches, often triggered by exertion, sex, bathing, postpartum state, or vasoactive substances. CTA/MRA; repeat/specialist imaging may be needed. Remove triggers; avoid triptans/ergots and unnecessary glucocorticoids; obtain neurological advice.
PRES / hypertensive encephalopathy	Headache, seizures, visual symptoms, confusion, and severe hypertension, often in pregnancy, renal disease, autoimmune disease, or cytotoxic therapy. Controlled BP reduction, seizure treatment, cause removal, MRI, critical care.
Pituitary apoplexy	Sudden severe headache with visual loss, ophthalmoplegia, altered consciousness, or hypotension. Urgent endocrine and neurosurgical consultation; cortisol and pituitary tests without delaying stress-dose corticosteroid when clinically indicated; MRI pituitary or urgent CT.
Cavernous sinus thrombosis	Severe headache, fever, orbital swelling, painful ophthalmoplegia, cranial-nerve deficits, or facial/sinus infection. Urgent contrast imaging, broad-spectrum IV antibiotics, and ENT/ophthalmology/neurology consultation.

15. Suspected bacterial meningitis and meningococcal disease

Step	Required practice
Recognize	Fever, headache, neck stiffness, altered consciousness, seizures, focal signs, petechial/purpuric rash, severe limb pain, shock, or rapid deterioration. Classic features may be absent, especially in infants, older adults, immunocompromised patients, and after antibiotics.
Precautions	Apply locally approved droplet precautions for suspected meningococcal disease and notify infection prevention/public health according to policy.
Bloods	Obtain blood cultures, CBC, CRP or PCT, glucose, renal/liver tests, lactate when unwell, coagulation where relevant, whole-blood meningococcal/pneumococcal PCR if available, and HIV testing according to consent and policy.
Antibiotics	Give IV empiric antibiotics as soon as bacterial meningitis is suspected and within 1 hour of arrival. Use a meningitis-dose third-generation cephalosporin; add locally approved Listeria coverage for age, pregnancy, or immunocompromise risk; add resistant-pneumococcus coverage when indicated by local epidemiology. Do not delay for imaging or LP.
Dexamethasone	When indicated, give with or immediately before the first antibiotic dose, or as soon as possible thereafter under the local policy. Never delay antibiotics to administer dexamethasone.

Step	Required practice
Lumbar puncture	Perform before antibiotics only when safe and when it will not cause clinically important delay. If antibiotics start first, perform LP as soon as it becomes safe. Measure blood glucose immediately before LP.
Sepsis / shock	Use the sepsis pathway, cautious age- and condition-appropriate fluids, vasoactive support when needed, glucose control, seizure treatment, and critical-care escalation.
Public health	For confirmed or likely meningococcal disease, follow local notification, contact identification, and chemoprophylaxis procedures. The ED shall not independently improvise contact regimens.

ANTIBIOTIC RULE: Imaging before lumbar puncture is not routine. If imaging is required because of focal features, abnormal pupils, GCS 9 or less, progressive consciousness decline, or concern for a mass lesion, take bloods, give antibiotics, stabilize, and then image.

16. Suspected encephalitis, brain abscess, and focal CNS infection

- Suspect encephalitis with altered behaviour, confusion, reduced consciousness, focal seizures, new neurological deficits, or fever without another explanation. Temporal-lobe features, dysphasia, hallucinations, or unusual behaviour may precede marked fever.
- Obtain blood cultures and start locally approved IV acyclovir promptly when HSV/VZV encephalitis is possible. Adjust for renal function and ensure appropriate hydration/monitoring. Do not wait for MRI, EEG, CSF PCR, or specialist review.
- Add empiric antibacterial meningitis treatment when bacterial infection cannot be excluded. Consider regionally relevant arboviral, tuberculosis, fungal, parasitic, and opportunistic infections according to exposure and immune status.
- Perform MRI and EEG when available, but CT is appropriate for urgent exclusion of haemorrhage, hydrocephalus, mass effect, or transfer planning. A normal early CT does not exclude encephalitis.
- Brain abscess is suggested by headache, fever, focal deficit, seizure, raised pressure, or a contiguous dental/ear/sinus source. Avoid LP when abscess or mass effect is suspected. Obtain contrast imaging and urgent neurosurgical/infectious-disease advice.
- Treat seizures and raised pressure; avoid routine corticosteroids for abscess unless there is clinically important mass effect and specialist agreement because steroids may alter diagnostic and therapeutic response.

17. Raised intracranial pressure and impending herniation

Priority	Required action
Recognize	Progressive GCS fall, new anisocoria or non-reactive pupil, posturing, severe headache/vomiting, papilloedema, sixth-nerve palsy, Cushing physiology, abnormal respiratory pattern, or imaging mass effect.
Position	Head of bed about 30 degrees when haemodynamically tolerated; neutral head and neck; remove venous obstruction; avoid tight collars unless essential for trauma.
Oxygenation / ventilation	Prevent hypoxaemia and sustained hypercapnia. Intubate when airway protection or ventilation is inadequate. Brief controlled hyperventilation only for imminent herniation as a bridge.
Perfusion	Avoid hypotension; treat shock; maintain adequate cerebral perfusion. Use disease-specific BP targets when haemorrhage or hypertensive emergency is present.
Hyperosmolar rescue	Give locally approved hypertonic saline or mannitol for clinical herniation or significant mass effect while arranging definitive care. Verify sodium/osmolality, renal and volume status, and monitor response; do not delay rescue solely for laboratory results in extremis.
Causes	Treat seizures, fever, hypoglycaemia, severe hyponatraemia, infection, haemorrhage, hydrocephalus, or tumour-related oedema according to the cause. Corticosteroids are indicated for vasogenic oedema from some tumours but not routine traumatic injury, stroke, or bacterial meningitis-related pressure.
Definitive care	Immediate neurosurgical/critical-care consultation, urgent imaging if not already obtained, and transfer for CSF diversion, decompression, lesion treatment, or neurocritical care.

LUMBAR-PUNCTURE PROHIBITION: Do not perform LP during unresolved airway or respiratory compromise, shock, uncontrolled seizures, clinically important bleeding risk, extensive rapidly spreading purpura, local infection, suspected mass lesion, new focal signs, abnormal pupils, GCS 9 or less, or progressive rapid consciousness decline.

18. Cerebral venous thrombosis

- Consider CVT in new severe or progressive headache, papilloedema, seizure, focal deficit, encephalopathy, or haemorrhagic-appearing infarct, especially with pregnancy/postpartum state, oestrogen exposure, dehydration, infection, malignancy, inflammatory disease, thrombophilia, anaemia, or recent head injury.
- Order CTV or MRV; a normal non-contrast CT does not exclude CVT. MRI/MRV may better define parenchymal injury and deep venous disease where available.
- Treat seizures and raised pressure. Obtain neurological/haematology/obstetric advice and start therapeutic anticoagulation after confirmation unless a specific contraindication exists; venous haemorrhagic infarction alone is not automatically a contraindication.
- Escalate urgently for coma, deep venous thrombosis, large haemorrhage/mass effect, clinical deterioration despite anticoagulation, or need for endovascular therapy or decompressive surgery.
- Pregnancy and puerperium require coordinated obstetric and specialist management. Use locally approved anticoagulants compatible with pregnancy/breastfeeding and the clinical context.

19. Other dangerous secondary headache diagnoses

Diagnosis / clue	ED action
Acute angle-closure glaucoma	Painful red eye, halos, vomiting, reduced vision, cloudy cornea, mid-dilated pupil. Measure pressure when trained; start approved pressure-lowering therapy and obtain immediate ophthalmology care.
Giant cell arteritis	New headache after age 50 with temporal tenderness, jaw/tongue claudication, visual symptoms, constitutional features, or polymyalgia. ESR/CRP/CBC; give prompt corticosteroid when suspected, especially with visual symptoms; urgent ophthalmology/rheumatology pathway.
Spontaneous intracranial hypotension / post-dural puncture	Orthostatic headache after neuraxial procedure or spontaneously. Assess for neurological red flags and CVT; fluids/cafeine and analgesia may help; anaesthesia/neurology review for epidural blood patch or imaging.
Carbon monoxide poisoning	Headache, dizziness, nausea, confusion, syncope, or chest pain affecting more than one person or linked to fuel/indoor exposure. Remove exposure, give high-concentration oxygen, obtain co-oximetry, ECG/troponin as indicated, and poison-centre/hyperbaric advice.
Hypertensive emergency	Severe BP with encephalopathy, visual symptoms, seizure, pulmonary oedema, renal injury, aortic syndrome, or pregnancy-related disease. Controlled IV reduction and cause-specific critical care; do not diagnose from BP alone.
Medication / substance-related	Stimulants, cocaine, amphetamines, serotonergic or vasoactive drugs, nitrates, withdrawal, overuse, or toxicity. Stabilize, ECG and targeted toxicology; avoid vasoconstrictive migraine therapy when vascular syndrome is possible.
Sinus, ear, dental, or mastoid complication	Severe or progressive headache with fever, orbital signs, focal deficits, cranial neuropathy, swelling, or immunocompromise. Contrast imaging and urgent ENT/dental/ophthalmic/infectious consultation.

20. Neuroimaging selection and communication

Modality	Use and safeguards
Non-contrast CT head	First-line for thunderclap headache, acute haemorrhage, hydrocephalus, mass effect, and rapidly deteriorating patient. Document onset-to-scan and interpretation time.
CTA head / neck	Aneurysm, arterial occlusion, dissection, RCVS, vascular malformation, or after confirmed SAH. Balance contrast risk against urgent neurological benefit; do not delay life-saving imaging for routine creatinine when immediate action is required.

Modality	Use and safeguards
CTV	Preferred rapid test for suspected CVT when MRI/MRV is not immediately available. Ensure correct venous timing and radiology communication.
MRI brain	Encephalitis, PRES, posterior fossa disease, pituitary lesion, tumour, abscess, demyelination, and CT-negative persistent red flags. Not a substitute for immediate CT in an unstable patient when MRI causes delay.
MRA / MRV	Arterial or venous vascular assessment without ionizing radiation; useful in pregnancy and selected renal/contrast contexts, subject to urgency and availability.
Repeat imaging	Required when the clinical state worsens, initial study was too early/limited for the suspected disease, RCVS remains possible, or specialist advice identifies an evolving process.
Image transfer	Send full images, report, contrast details, and time stamps electronically before or with transfer. A verbal summary alone is insufficient.

21. Lumbar puncture: indication, safety, and specimen handling

21.1 Indications

- Suspected meningitis or encephalitis when no contraindication exists; suspected SAH after a negative CT when LP is the selected approved test; selected inflammatory, neoplastic, pressure, or opportunistic conditions after specialist discussion.
- LP is not a screening test for every severe headache. The indication, anticipated result, and how it will change management shall be documented.

21.2 Pre-procedure safety

- Stabilize airway, breathing, shock, uncontrolled seizures, and major agitation first. Review platelets, coagulation, anticoagulants, local anaesthetic allergy, spinal anatomy, infection at the site, and ability to position safely.
- Do not routinely image before LP in suspected meningitis. Image first when there is concern for mass lesion or raised pressure, including new focal features, seizures/posturing, abnormal pupils, GCS 9 or less, or progressive rapid consciousness decline.
- If imaging is required for suspected meningitis, take bloods, administer antibiotics and acyclovir as indicated, stabilize, and then image. Do not wait for a normal scan to start treatment.

21.3 Procedure and specimens

- Use aseptic technique, appropriate positioning, atraumatic needle where available, local anaesthesia, and trained assistance. Measure opening pressure in a relaxed lateral position when clinically relevant and feasible without delaying urgent care.
- Collect sequentially labelled tubes. Minimum tests for suspected bacterial meningitis: cell count with differential, protein, CSF glucose with near-simultaneous blood glucose, Gram stain/microscopy, culture/susceptibility, and pathogen PCR. Retain residual CSF.
- For encephalitis, add HSV/VZV PCR and other locally relevant tests. For suspected SAH, follow the approved red-cell/xanthochromia pathway and laboratory timing requirements.
- Document opening pressure, needle type/level, number of attempts, appearance, tubes and tests, complications, and the clinician responsible for reviewing every result.

22. Laboratory and microbiology investigations

Clinical context	Suggested tests
All high-risk severe headache	Glucose; CBC; renal function/electrolytes; pregnancy test when relevant; coagulation and group/save when haemorrhage, procedure, or anticoagulation is possible; additional testing guided by physiology.
Suspected bacterial meningitis / sepsis	Blood cultures before antibiotics when this causes no delay; CRP/PCT; lactate; blood glucose; whole-blood meningococcal/pneumococcal PCR if available; HIV testing according to policy.
Encephalitis / immunocompromise	Cultures; HIV; targeted viral, fungal, tuberculosis, parasitic, arboviral, and autoimmune tests in consultation with microbiology/infectious diseases.
CVT / thrombosis	CBC including platelets, coagulation, pregnancy test, renal/liver function; thrombophilia testing usually deferred or specialist-directed because acute illness and anticoagulation alter results.

Clinical context	Suggested tests
Giant cell arteritis	ESR, CRP, CBC/platelets, liver tests as relevant. Normal markers reduce but do not eliminate suspicion when visual or ischaemic features are present.
Pituitary apoplexy	Cortisol, glucose, sodium, thyroid and other pituitary tests when feasible, but do not delay emergency corticosteroid or neurosurgical treatment in an unstable patient.
Toxic / environmental	Co-oximetry, ECG, troponin, paracetamol/salicylate or targeted toxicology, CK, osmolality, or blood gas according to exposure and physiology.

23. Analgesia and treatment of likely primary headache

Treat pain and nausea early while evaluation proceeds. Symptom improvement does not prove a benign diagnosis. Once dangerous secondary causes have been reasonably excluded, use the locally approved primary-headache pathway.

- Prefer non-opioid regimens such as paracetamol/acetaminophen, an NSAID when safe, and a migraine-active antiemetic or other evidence-based agent. Correct dehydration when present.
- Avoid routine opioids because they are less effective for many primary headaches, increase recurrence and adverse effects, and may complicate reassessment. Reserve them for exceptional documented indications.
- Avoid triptans or ergots when SAH, dissection, RCVS, uncontrolled hypertension, pregnancy-related vascular disease, or another vasoconstrictive-risk condition remains possible.
- For cluster headache, use high-flow oxygen and an approved triptan only after vascular contraindications have been considered. Arrange specialist prevention and follow-up.
- Avoid routine neuroimaging for a typical recurrent primary headache with normal examination and no red flags; equally, do not use a prior migraine label to bypass red-flag evaluation.

24. Special populations

24.1 Children and adolescents

- Use age-appropriate physiology, consciousness scale, weight-based medicines, and paediatric sepsis/meningitis pathways. Infants may present with irritability, poor feeding, bulging fontanelle, altered tone, or temperature instability rather than headache or stiffness.
- Consider abusive head trauma, hydrocephalus/shunt failure, posterior fossa tumour, CNS infection, poisoning, hypertension, and sickle-cell complications. Early paediatric consultation is required for high-risk presentations.
- Neonates follow the neonatal infection and neurological emergency pathway; this protocol does not replace neonatal antibiotic regimens.

24.2 Pregnancy and postpartum

- Check BP, urine protein, neurological status, and gestational/postpartum interval. Consider preeclampsia/eclampsia, PRES, CVT, pituitary apoplexy, RCVS, dissection, and SAH.
- Maternal stabilization takes priority. Necessary CT and vascular imaging must not be withheld because of pregnancy. Use MRI/MRV when clinically equivalent and timely, but do not create dangerous delay.
- Call obstetrics early. Treat severe hypertension and eclampsia with the approved obstetric pathway; fetal assessment follows maternal stabilization.

24.3 Older adults

- New headache after age 50 has a lower threshold for secondary-cause investigation. Consider giant cell arteritis, haemorrhage, malignancy, infection, medication effects, glaucoma, and carbon monoxide.
- Presentations may lack fever or meningism. Establish baseline cognition/function and review anticoagulants, immunosuppression, falls, and capacity for safe discharge.

24.4 Immunocompromised patients

- Use a low threshold for imaging, cultures, LP when safe, and broad infectious testing. Consider cryptococcal, tuberculosis, fungal, parasitic, CMV, toxoplasma, bacterial, and atypical viral disease according to immune defect and geography.
- Raised intracranial pressure may be substantial even with subtle symptoms. Obtain infectious-disease, neurology, and microbiology advice early; empiric therapy shall follow the local immunocompromised-host pathway.

24.5 Anticoagulated or bleeding-risk patients

- Use a low threshold for urgent CT. Obtain the exact agent, dose, time, renal function, indication, and available specific level. Activate reversal immediately for confirmed or strongly suspected clinically important intracranial bleeding.
- LP requires an approved anticoagulant/platelet/coagulation safety decision. Do not perform an unsafe LP merely because imaging is negative.

25. Monitoring and reassessment

Clinical state	Minimum monitoring and reassessment
Resuscitation / unstable	Continuous ECG and pulse oximetry; frequent BP; airway/ventilation; GCS, pupils and focal findings at least every 5-15 minutes according to acuity; glucose and temperature; response to every intervention.
Suspected CNS infection	Sepsis observations, neurological trend, rash progression, urine output, glucose/electrolytes, antibiotic and dexamethasone times, seizure activity, and LP/imaging status.
Confirmed haemorrhage / raised pressure	Continuous monitoring; frequent GCS/pupils; BP within ordered range; airway/CO ₂ ; anticoagulant reversal; sodium/osmolality after hyperosmolar therapy; hydrocephalus and seizure surveillance.
After negative initial tests	Repeat complete neurological assessment and red-flag review. Persistent, recurrent, or changing symptoms require reconsideration of CTA/CTV/MRI/LP, specialist review, or observation.
Before discharge	Stable observations; controlled symptoms; normal or safe baseline neurological function; oral intake/mobility where relevant; no unresolved dangerous differential; follow-up and pending-result ownership confirmed.

The responsible clinician shall document the next reassessment time. Any new focal deficit, reduced consciousness, seizure, abnormal pupil, fever, rash, hypotension, severe BP rise, visual loss, recurrent thunderclap, or escalating pain triggers immediate senior review and renewed diagnostic escalation.

26. Consultation, escalation, and transfer

- Immediate neurovascular/neurosurgical contact for confirmed or highly suspected SAH, intracerebral haemorrhage with deterioration or mass effect, hydrocephalus, pituitary apoplexy, brain abscess, herniation, severe CVT, or another lesion requiring intervention.
- Neurology consultation for persistent unexplained severe headache, focal signs, CVT, RCVS, PRES, encephalitis, recurrent thunderclap, or uncertainty affecting LP, imaging, anticoagulation, or discharge.
- Critical-care/anaesthesia consultation for GCS decline, airway or ventilation risk, shock, refractory seizures, severe sepsis, hyperosmolar rescue, high-risk sedation, or unstable transfer.
- Infectious-disease/microbiology consultation for CNS infection, unusual exposure, immunocompromise, treatment allergy/resistance, or public-health implications.
- Obstetric, paediatric, ophthalmology, ENT/dental, endocrinology, haematology, toxicology, or rheumatology input according to the suspected cause.
- Transfer early when neurosurgery, neurointervention, neurocritical care, MRI/MRV, microbiology, ophthalmology, or paediatric/obstetric critical care is unavailable. The referring team remains responsible for treatment and monitoring until direct handover.
- Match escort, airway capability, oxygen, suction, monitoring, pumps, reversal/rescue medicines, and transport urgency to the risk of deterioration. Send images and reports before departure where possible.

27. Disposition

Disposition	Indications / requirements
Critical care / resuscitation admission	Airway/ventilation support, shock, progressive reduced consciousness, herniation risk, refractory seizures, severe sepsis, unstable haemorrhage, severe PRES/eclampsia, continuous infusion, or need for invasive monitoring.
Neurosurgical / neurovascular transfer	Confirmed or highly suspected aneurysmal SAH, significant intracranial haemorrhage, hydrocephalus, mass lesion, abscess, pituitary apoplexy, severe CVT, or lesion requiring intervention not available locally.
Monitored ward / specialist admission	CNS infection, incomplete neurological recovery, persistent severe symptoms, abnormal imaging/CSF, high-risk pregnancy/postpartum headache, anticoagulation issue, immunocompromise, visual emergency, or unsafe social/clinical context.
Observation unit	Selected stable patients requiring serial neurological assessment, delayed MRI/LP/specialist review, or confirmation of symptom resolution, only where explicit criteria and escalation capability exist.

Disposition	Indications / requirements
Discharge	Only after dangerous secondary causes have been reasonably excluded, symptoms are acceptably controlled, neurological examination is safe, no high-risk investigation or consultation remains unowned, reliable supervision/transport exists, and written precautions/follow-up are provided.
Death / end-of-life pathway	Use the relevant protocol for catastrophic neurological injury, treatment limitation, expected or unexpected death, family communication, documentation, organ-support considerations, and bereavement care.

28. Discharge information and safety

- Explain the working diagnosis, uncertainty, tests and results, medicines given, expected course, and the clinician/service responsible for pending results and follow-up.
- Return immediately for sudden or worsening headache, fever, stiff neck, rash, repeated vomiting, collapse, seizure, confusion, weakness/numbness, speech/vision change, severe eye pain/redness, pregnancy-related symptoms, or inability to maintain hydration.
- Provide primary-headache medicine instructions, maximum safe doses, medication-overuse warning, hydration/sleep advice, and a written plan. Avoid vague advice to “take painkillers as needed” without limits.
- After LP, explain expected minor symptoms and urgent warning signs. A post-dural-puncture headache that is severe, prolonged, atypical, non-positional, or accompanied by neurological change requires reassessment.
- Patients with possible TIA/stroke, meningitis exposure, giant cell arteritis, pregnancy-related disease, ocular emergency, or vascular syndrome require the specific follow-up pathway rather than routine headache review.
- Document capacity, language/communication support, responsible adult, transport, medicine access, and ability to return. Do not discharge solely because imaging is normal when the clinical syndrome remains unexplained or high risk.

29. Documentation and handover

Required element	Minimum documentation
Timeline	Onset, time to maximal intensity, last known well, fever/illness course, collapse/seizure, postpartum interval, arrival, imaging, LP, antibiotics/acyclovir/reversal, consultation, acceptance and departure times.
Red flags	First/worst/different headache, thunderclap, exertional/positional features, fever/meningism, focal/visual signs, seizure, consciousness change, pregnancy, cancer/immunocompromise, anticoagulants, age over 50, trauma, toxic exposure.
Examination	ABCDE, observations, GCS components, pupils, visual status, cranial nerves, motor/sensory/coordination/gait, rash, meningism, fundus/eye findings when assessed, and serial change.
Diagnostic reasoning	Dangerous diagnoses considered, reason for imaging modality, CT timing/quality, LP or no-LP decision, infection treatment decision, and interpretation of negative or equivocal tests.
Medicines	Analgesia/antiemetic; antibiotic/antiviral; dexamethasone; BP treatment; anticoagulant reversal; seizure or hyperosmolar therapy; dose, route, time, checks, response and adverse effects.
Results	Imaging, bloods, CSF, microbiology/PCR, ECG, critical communications, pending tests, and named accountable reviewer.
Handover / disposition	Current neurological state, recurrence/deterioration risk, airway/BP targets, isolation, next treatment/observation, outstanding actions, receiving clinician, transfer equipment, family update, and return advice.

30. Quality indicators and audit

Indicator	Suggested local measure
Red-flag recognition	Percentage of severe-headache cases with onset-to-peak and structured red-flag review documented.
Imaging timeliness	Arrival-to-CT and report time for thunderclap, focal deficit, reduced consciousness, anticoagulation, or suspected haemorrhage.

Indicator	Suggested local measure
Meningitis treatment	Percentage of suspected bacterial meningitis cases receiving IV antibiotics within 1 hour of arrival; blood culture and dexamethasone timing.
Encephalitis treatment	Time to IV acyclovir when HSV/VZV encephalitis is suspected; renal adjustment and monitoring documented.
LP safety	Percentage with indication, contraindication review, blood glucose, opening pressure where relevant, complete CSF tests, and named result owner.
SAH completion	Percentage of clinically at-risk CT-negative cases with documented rationale for LP, CTA, observation, specialist review, or exclusion.
Neurological monitoring	Percentage of high-risk cases with serial GCS, pupils and focal findings at an acuity-appropriate frequency.
Transfer	Time from diagnostic confirmation to receiving-centre contact, acceptance and departure; avoidable delays and image-transfer failures.
Medication / reversal safety	Correct agent, dose, time, independent check, renal/pregnancy adjustment, and response documented.
Safe discharge	Controlled symptoms, safe examination, red-flag return instructions, follow-up, and pending-result ownership documented.
Equity and dignity	Review delays or harm related to age, disability, pregnancy, language, finances, transport, stigma, lack of imaging, or lack of specialist access.

31. Training and implementation

- All triage, ED, EMS, radiology, laboratory, nursing, medical, paediatric, obstetric, pharmacy, and transfer teams shall train on thunderclap recognition, meningitis antibiotic timing, LP safety, herniation response, and transfer activation.
- Resuscitation and acute areas shall display a one-page workflow, CT/CTA/CTV selection guide, empiric CNS infection regimen, anticoagulant reversal contacts, hyperosmolar protocol, LP checklist, and specialist/transfer numbers.
- Simulation shall include CT-negative thunderclap headache, meningitis requiring imaging before LP, rapid herniation, postpartum CVT/PRES, anticoagulant-associated haemorrhage, paediatric meningitis, and imaging downtime.
- Radiology and laboratory shall define priority standards and direct critical-result communication. The hospital shall maintain a 24-hour solution for imaging interpretation and CSF processing or an explicit transfer pathway.
- Clinical governance shall audit severe-headache and meningitis cases, review all diagnostic delays or missed secondary headaches, and update the protocol after guideline, formulary, service, or epidemiological change.

ANNEX A. One-page acute severe headache workflow

Stage	Action
1. Recognize	Thunderclap; fever/meningism; focal deficit; seizure; GCS/pupil change; papilloedema; pregnancy/postpartum; severe hypertension; anticoagulants; cancer/immunocompromise; visual emergency.
2. Stabilize	ABCDE, glucose, monitoring, IV access, serial GCS/pupils/focal exam, analgesia/antiemetic, seizure and shock treatment.
3. Treat now	Suspected meningitis: cultures + antibiotics within 1 hour, dexamethasone when indicated. Encephalitis: acyclovir. Haemorrhage: reversal/BP/neurosurgery. Herniation: positioning + hyperosmolar rescue + airway/critical care.
4. Image for the danger	CT for acute blood/mass; CTA for aneurysm/dissection/RCSV; CTV/MRV for CVT; MRI for encephalitis/PRES/posterior fossa/pituitary/abscess.
5. LP when safe	Meningitis/encephalitis or selected CT-negative SAH. Do not LP unstable patients or those with unresolved focal/pupil/GCS/mass-effect risk.
6. Reassess	Repeat GCS, pupils, focal/visual findings and red flags. Negative initial testing does not end evaluation if syndrome remains high risk.

Stage	Action
7. Disposition	Early transfer/admit for haemorrhage, CNS infection, raised pressure, CVT, abnormal tests, persistent symptoms or unsafe context. Discharge only after reasonable exclusion, control, instructions and follow-up.

ANNEX B. Secondary-headache danger-sign card

- ☐ Sudden onset or maximal intensity within 1 hour; first, worst, or distinctly different headache.
- ☐ Fever, neck stiffness, rash, photophobia, altered behaviour, or immunocompromise.
- ☐ Collapse, seizure, focal deficit, aphasia, ataxia, visual loss, abnormal pupil, papilloedema, or GCS change.
- ☐ Pregnancy or up to 6 weeks postpartum; severe hypertension or proteinuria.
- ☐ Anticoagulant/antiplatelet therapy, bleeding disorder, cancer, HIV, transplant, or immunosuppressive therapy.
- ☐ Age over 50 with new headache; temporal tenderness, jaw claudication, or visual symptoms.
- ☐ Head/neck trauma, manipulation, painful Horner syndrome, or neck pain with neurological symptoms.
- ☐ Exertional, sexual, cough/Valsalva, positional, awakening, progressive, or persistent vomiting pattern.
- ☐ Red eye, corneal haze, fixed pupil, ophthalmoplegia, or acute visual loss.
- ☐ Multiple people affected, fuel/heater exposure, stimulant/cocaine/vasoactive drug use, or withdrawal.

ANNEX C. First-10-minute checklist

- ☐ Resuscitation/monitored location and senior clinician assigned.
- ☐ Onset, time to peak, last known well, fever timeline, postpartum interval, anticoagulant last dose recorded.
- ☐ ABCDE, observations, glucose, GCS components, pupils and focal findings documented.
- ☐ IV access, ECG/pulse oximetry/BP monitoring according to acuity.
- ☐ Pregnancy test, cultures and urgent bloods ordered as indicated.
- ☐ Droplet isolation activated when meningococcal disease possible.
- ☐ Antibiotics within 1 hour and acyclovir when encephalitis possible; no CT/LP delay.
- ☐ Urgent CT/CTA/CTV/MRI pathway activated for suspected diagnosis.
- ☐ Anticoagulant reversal / severe-BP / seizure / herniation pathway activated when indicated.
- ☐ Analgesia and antiemetic given; next neurological reassessment time named.

ANNEX D. Imaging decision card

Pattern	Imaging
Thunderclap, collapse, meningism, acute severe headache	Non-contrast CT urgently; CTA or LP if SAH risk remains; CTA for aneurysm/dissection/RCS.
Headache + focal deficit / stroke signs	CT + CTA head/neck under stroke pathway; MRI when needed and timely.
Headache + seizure / papilloedema / postpartum / thrombosis risk	CT plus CTV, or MRI/MRV.
Fever/meningism, no focal/pupil/GCS risk	LP without routine prior imaging; antibiotics must not be delayed.
Fever/meningism with focal sign, abnormal pupil, GCS ≤ 9 , rapid decline	Bloods + antibiotics/acyclovir + stabilization, then urgent CT/MRI; defer LP.
Visual loss / ophthalmoplegia / pituitary features	MRI pituitary/orbits or urgent CT if MRI unavailable; specialty assessment.
Persistent red flags after negative CT	CTA/CTV/MRI/LP or specialist observation according to the suspected diagnosis; do not discharge by CT alone.

ANNEX E. Suspected SAH checklist

- ☐ Exact onset and time to maximal intensity documented; witnessed collapse, exertion, neck pain/stiffness, vomiting and seizure recorded.
- ☐ GCS, pupils, focal examination and BP trend documented repeatedly.
- ☐ Non-contrast CT completed urgently and interpreted by qualified reader; scan time relative to onset recorded.
- ☐ If CT negative, residual SAH risk assessed; LP or CTA pathway completed or specialist rationale documented.

- ☐ Anticoagulants stopped and reversal activated if haemorrhage confirmed/suspected.
- ☐ Pain/nausea treated; hypotension avoided; severe hypertension managed with titratable therapy.
- ☐ Neurovascular/neurosurgical service contacted early; images transferred; acceptance and transport plan recorded.
- ☐ Nimodipine considered after confirmation under local/specialist plan; transfer not delayed.
- ☐ Airway, seizure, hydrocephalus and herniation contingency in place.
- ☐ Family informed and direct clinical handover completed.

ANNEX F. Suspected CNS infection checklist

- ☐ Fever, rash, meningism, altered behaviour, seizure, focal signs and immune status documented.
- ☐ Droplet precautions/public-health pathway activated when meningococcal disease possible.
- ☐ Blood cultures, CBC, inflammatory marker, glucose, renal/liver tests, lactate and PCR obtained as indicated.
- ☐ IV antibiotics administered within 1 hour; exact time documented.
- ☐ Listeria and resistant-pneumococcus coverage considered according to age, pregnancy, immune status and local epidemiology.
- ☐ Dexamethasone given with/before first antibiotic when indicated; antibiotic not delayed.
- ☐ IV acyclovir started promptly when encephalitis possible; renal adjustment/hydration documented.
- ☐ LP performed promptly if safe, or contraindication and imaging-before-LP reason documented.
- ☐ CSF cell count/differential, protein, glucose ratio, microscopy, culture, PCR and residual storage requested.
- ☐ Seizure, sepsis, sodium/glucose, raised pressure and critical-care risks monitored.

ANNEX G. Lumbar-puncture safety and procedure checklist

- ☐ Clear indication and anticipated clinical decision documented.
- ☐ Airway, breathing, shock and uncontrolled seizure stabilized.
- ☐ No extensive rapidly spreading purpura or infection at puncture site.
- ☐ No unresolved new focal features, abnormal pupils, GCS ≤ 9 , rapid consciousness decline, posturing, or mass-lesion concern.
- ☐ Platelet/coagulation/anticoagulant safety reviewed according to local policy.
- ☐ Blood glucose measured immediately before LP.
- ☐ Consent/capacity, positioning, asepsis, atraumatic needle and trained assistant addressed.
- ☐ Opening pressure measured when relevant and feasible in lateral position.
- ☐ Tubes sequentially labelled; all required CSF and blood tests ordered; residual CSF retained.
- ☐ Procedure details, complications, aftercare, result owner and review deadline documented.

ANNEX H. Minimum CSF dataset

Indication	Minimum studies
Suspected bacterial meningitis	Opening pressure when feasible; cell count/differential; protein; CSF glucose with paired blood glucose; Gram stain/microscopy; culture/susceptibility; bacterial PCR; retain residual sample.
Suspected encephalitis	Above as relevant plus HSV-1/2 and VZV PCR; targeted enterovirus, arbovirus, TB, fungal, cryptococcal, autoimmune or other studies after specialist discussion.
Suspected SAH after negative CT	Opening pressure; red-cell counts in sequential tubes; xanthochromia according to local laboratory method/timing; additional tests for alternative diagnoses.
Immunocompromised	Broad microbiological panel guided by immune defect and geography; larger CSF volume may be required; coordinate with laboratory before procedure.
Result governance	Critical CSF results directly communicated; all pending culture/PCR/cytology tests assigned to a named clinician/service with contact plan.

ANNEX I. Raised ICP / herniation rescue checklist

- ☐ Airway-skilled, critical-care and neurosurgical/receiving teams called.
- ☐ Head elevated, neck neutral, venous obstruction relieved; oxygenation and BP supported.
- ☐ GCS, pupils, posturing and respiratory pattern recorded serially.

- ☐ Glucose, seizure, temperature and sodium abnormalities treated.
- ☐ Hypertonic saline or mannitol given under approved protocol for clinical herniation/mass effect; response and labs monitored.
- ☐ Brief controlled hyperventilation used only for imminent herniation while definitive intervention arranged.
- ☐ Urgent CT and definitive surgical/CSF-diversion plan activated; transfer not delayed.
- ☐ No lumbar puncture performed.
- ☐ Sedation, analgesia and ventilation targets documented after intubation.
- ☐ Family communication and treatment goals documented.

ANNEX J. Cerebral venous thrombosis checklist

- ☐ Headache pattern, papilloedema, seizure, focal deficit and consciousness documented.
- ☐ Pregnancy/postpartum, oestrogen, dehydration, infection, malignancy, autoimmune disease, anaemia and thrombophilia risks reviewed.
- ☐ CTV or MRV ordered; routine CT not accepted as exclusion.
- ☐ Neurology/haematology/obstetric consultation obtained.
- ☐ Therapeutic anticoagulation started after confirmation unless a specific contraindication documented.
- ☐ Seizures and raised ICP treated; visual function and papilloedema monitored.
- ☐ Deterioration, deep venous disease, mass effect or coma triggered neurocritical/neurosurgical escalation.
- ☐ Pregnancy/breastfeeding-compatible anticoagulant plan documented.

ANNEX K. Pregnancy and postpartum severe-headache checklist

- ☐ Gestational age or postpartum interval documented; obstetrics called early.
- ☐ BP repeated with correct cuff; urine protein, CBC/platelets, renal/liver tests and haemolysis assessment ordered as indicated.
- ☐ Preeclampsia/eclampsia, PRES, CVT, RCVS, pituitary apoplexy, dissection and SAH considered.
- ☐ Magnesium sulfate and severe-hypertension treatment started under obstetric protocol when indicated.
- ☐ Maternal ABC and neurological stabilization completed before fetal assessment.
- ☐ Necessary CT/CTA/CTV not withheld; MRI/MRV used when equally timely and appropriate.
- ☐ Anticoagulant and medication pregnancy/breastfeeding safety verified.
- ☐ Admission/transfer and postpartum follow-up clearly arranged.

ANNEX L. Paediatric headache / meningism checklist

- ☐ Age, weight, hydration, observations and age-appropriate consciousness documented.
- ☐ Fever, irritability, poor feeding, bulging fontanelle, rash, seizure and neck stiffness assessed.
- ☐ Abusive head trauma, shunt malfunction, tumour/posterior fossa disease, hypertension, infection and poisoning considered.
- ☐ Paediatric sepsis/meningitis antibiotics and dexamethasone pathway activated without delay.
- ☐ Imaging-before-LP criteria applied; neonatal pathway used for neonates.
- ☐ All medicines weight-based and independently checked.
- ☐ Paediatric/critical-care transfer activated for deterioration, CNS infection, focal signs, raised pressure or diagnostic uncertainty.
- ☐ Parents/carers receive written return precautions and follow-up.

ANNEX M. Immunocompromised-patient checklist

- ☐ Immune defect, HIV status/CD4 when known, transplant, chemotherapy, steroid/biologic use and prophylaxis documented.
- ☐ Low threshold for blood cultures, imaging and safe LP.
- ☐ Cryptococcus, TB, toxoplasma, fungal, bacterial, viral and parasitic causes considered according to geography and immune defect.
- ☐ Opening pressure measured when safe and relevant; raised pressure actively managed.
- ☐ Empiric therapy discussed early with infectious diseases/microbiology; drug interactions and renal/hepatic adjustments checked.
- ☐ Admission and reliable ownership of prolonged cultures/PCR/antigen results arranged.

ANNEX N. Primary-headache discharge checklist

- ☐ Presentation is compatible with a primary headache and no dangerous red flag remains unresolved.
- ☐ Neurological, visual and gait assessment is normal or at documented safe baseline.
- ☐ Symptoms acceptably controlled; oral intake and mobility safe; observations stable.
- ☐ No investigation, culture, imaging over-read or specialist review remains without a named owner.
- ☐ Non-opioid medicine plan, maximum doses and medication-overuse warning provided.

- ☐ Vasoconstrictive therapy avoided when vascular cause not securely excluded.
- ☐ Written emergency return signs explained; communication/language needs addressed.
- ☐ Follow-up date/service and responsible adult/transport confirmed.

ANNEX O. Transfer and handover minimum dataset

Category	Required information
Identity / contacts	Patient identifiers, family/decision-maker, referring and receiving clinicians, callback numbers, infection status.
Timeline	Onset, time to peak, last known well, fever/seizure/collapse, arrival, CT/CTA/CTV/MRI/LP, treatments, acceptance and departure.
Clinical state	Airway/ventilation, GCS, pupils, focal/visual findings, BP target, seizures, rash/sepsis, pregnancy/postpartum status.
Treatments	Analgesia, antibiotics/acyclovir/dexamethasone, reversal, antihypertensive, seizure and hyperosmolar therapy; doses/times/response.
Results	Full imaging and report, bloods, CSF, microbiology/PCR, ECG and pending tests with named owner.
Transport risk	Rebleeding/herniation/seizure/sepsis risk, airway plan, oxygen/suction, rescue medicines, pumps, escort and contingency.
Next actions	Next observation, medicine, imaging/procedure, specialist review, isolation, family update and treatment limits.

ANNEX P. Audit tool

Case review item	Yes / No / N/A / notes
Onset and time to peak documented	
Structured secondary-headache red flags documented	
ABCDE, glucose, GCS, pupils and focal examination completed	
Urgent imaging selected and completed appropriately	
Antibiotics within 1 hour for suspected bacterial meningitis	
Acyclovir timely for suspected encephalitis	
LP indication and contraindication review documented	
Blood glucose and complete CSF dataset obtained	
CT-negative SAH pathway completed or rationale documented	
Anticoagulant reversal / BP / herniation treatment timely	
Serial neurological observations completed	
Specialist/receiving-centre contact and transfer timely	
Pending results assigned to named owner	
Safe discharge instructions and follow-up completed	
Delay, equity, dignity or system issue identified and reviewed	

ANNEX Q. Local configuration checklist

- ☐ 24-hour CT and interpretation pathway; CTA/CTV access or rapid transfer alternative.
- ☐ MRI/MRA/MRV priority and after-hours transfer pathway.
- ☐ Approved CT-negative SAH pathway defining the role of 6-hour CT, LP, CTA and shared decision-making.

- [] Adult, paediatric, pregnancy and immunocompromised empiric meningitis/encephalitis regimens with exact doses and adjustments.
- [] Dexamethasone criteria and timing; meningococcal isolation, notification and contact-prophylaxis policy.
- [] LP competency, equipment, anticoagulant thresholds, specimen tubes, laboratory tests, xanthochromia method and result communication.
- [] Anticoagulant reversal agents, dosing, stock location and haemorrhage escalation contacts.
- [] Hypertonic saline/mannitol protocol, monitoring and airway/critical-care activation.
- [] Neurosurgery, neurointervention, neurology, infectious-disease, obstetric, paediatric, ophthalmology and poison-centre contacts.
- [] Electronic image-transfer process and transport capability for unstable neurological patients.
- [] Primary-headache non-opioid treatment order set and discharge leaflets.
- [] Named audit lead, data definitions, simulation schedule and serious-incident review process.

ANNEX R. References and source tools

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6. American College of Emergency Physicians. Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients Presenting to the Emergency Department With Acute Headache. Annals of Emergency Medicine. 2019;74:e41-e74.
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9. Neurocritical Care Society. Emergency Neurological Life Support: Intracranial Hypertension and Herniation Protocol. Current version accessed June 2026.
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11. Local source tools to attach before approval: empiric CNS infection order set; CT-negative SAH algorithm; anticoagulant reversal guide; hyperosmolar therapy protocol; LP procedure and laboratory guide; meningococcal public-health form; transfer checklist; primary-headache treatment and discharge leaflet.