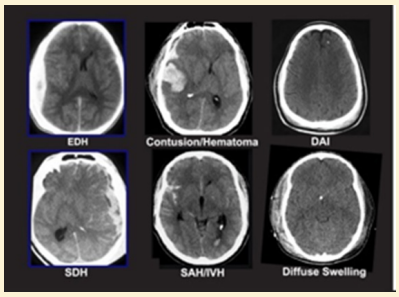
SUBARACHNOID HAEMORRHAGE (SAH)

MANAGEMENT WITH AND WITHOUT CT AVAILABILITY

Subarachnoid haemorrhage is bleeding into the subarachnoid space, most commonly from rupture of a cerebral aneurysm. It is a time critical neurological emergency with high early mortality due to rebleeding and acute hydrocephalus.



ED priorities are identical regardless of CT access:

- Recognise early
- Prevent rebleeding
- Preserve cerebral perfusion
- Avoid secondary brain injury
- Expedite neurosurgical care

What differs is how definitive your diagnosis and downstream actions can be.

CLINICAL RECOGNITION (SAME WITH OR WITHOUT CT)

HIGH RISK FEATURES

- Sudden onset, maximal at onset headache ("thunderclap", "worst headache of life")
- Vomiting
- Neck stiffness / photophobia
- Collapse or loss of consciousness
- Seizure at onset
- Rapid neurological deterioration

⚠ Normal neurological exam does NOT exclude SAH.

CORE PHYSIOLOGY

Major early killers:

- Rebleeding (especially first 24–48 hrs)
- Raised ICP / hydrocephalus
- Neurogenic cardiac dysfunction

ED management directly affects:

- Risk of rebleed (BP, agitation, vomiting)
- Cerebral perfusion (avoid hypotension)
- Survival to definitive aneurysm treatment

DIAGNOSTIC PATHWAY — COMPARISON

WHEN CT IS AVAILABLE

- Non contrast CT head is first line
- High sensitivity in early hours
- Confirms SAH and guides next steps (CTA, neurosurgery)

If CT negative but suspicion high:

- Lumbar puncture (after excluding raised ICP)

WHEN CT IS NOT AVAILABLE

- You cannot confirm or exclude SAH
- No imaging modality substitutes reliably:
  - Skull X ray → no role
  - Ultrasound → no intracranial visualisation in adults
- Diagnosis becomes **clinical + risk based**
- Management becomes **protective and conservative**
- Early transfer is **definitive management**

MANAGEMENT PRINCIPLES — WHAT CHANGES, WHAT DOESN'T

Aspect	CT Available	CT Not Available
Diagnosis	Confirm bleed	Assume possible SAH
BP control	Targeted	Conservative, avoid swings
Antiplatelets	Avoid	Avoid
Anticoagulation	Reverse if present	Reverse if present
Nimodipine	Start	Start if suspicion high
Definitive care	CTA → coiling/clipping	Transfer urgently
ED goal	Stabilise + refer	Stabilise + transfer

BLOOD PRESSURE MANAGEMENT (CRITICAL IN BOTH)

Shared principles

- Prevent rebleeding
- Maintain cerebral perfusion
- Avoid rapid BP changes

⚠ Hypotension = catastrophic cerebral hypoperfusion.

Practical ED targets

CT available (confirmed SAH):

- Aim SBP <140–160 mmHg
- Titrate IV agents carefully

CT not available:

- Do NOT aggressively lower BP
- Avoid SBP extremes:
  - Avoid SBP >180–200
  - Avoid SBP <120

Gentle control only if severely hypertensive

MEDICAL MANAGEMENT (SAME CORE CARE)

NIMODIPINE

- Start **as soon as SAH suspected or confirmed**
- Reduces delayed cerebral ischaemia
- Does not increase bleeding risk

Reasonable to start even without CT if suspicion is high and transfer planned.

ANALGESIA + ANTIEMETICS

- Treat pain and vomiting aggressively
- Vomiting ↑ ICP and rebleeding risk
- Avoid oversedation masking deterioration

ANTICOAGULATION

- If patient is anticoagulated:
  - **Reverse immediately** in both scenarios
- Bleeding risk outweighs thrombotic risk acutely

POSITIONING & GENERAL NEUROPROTECTION

In all suspected/confirmed SAH:

- Head elevated 30°
- Neck midline (avoid venous obstruction)
- SpO_2 ≥94%
- Normoglycaemia
- Treat fever
- Quiet environment

HYDROCEPHALUS & DETERIORATION (CLINICAL DIAGNOSIS)

Suspect if:

- Falling GCS
- Worsening headache
- Bradycardia / hypertension
- New vomiting

Without CT:

- Cannot confirm radiologically
- Treat supportively + urgent transfer

WHAT TO AVOID (ESPECIALLY WITHOUT CT)

- Antiplatelets
- Anticoagulation
- Rapid BP drops
- Overhydration
- Reassurance based on "normal exam"
- Delays to neurosurgical centre

DEFINITIVE CARE

- Aneurysm securing (coiling / clipping)
- Neurocritical care
- Management of vasospasm & delayed ischaemia

CHECKLIST
SUSPECTED SUBARACHNOID HAEMORRHAGE

CT AVAILABLE vs CT NOT AVAILABLE

INITIAL STABILISATION (ABCDE)

- [ ] Airway: Protect if GCS ≤8 or vomiting
- [ ] Breathing: O_2 if hypoxic (target SpO_2 ≥94%)
- [ ] Circulation: 2 IVs, cardiac monitoring
- [ ] Disability: GCS, pupils, focal deficits
- [ ] Glucose: Check and correct

DIAGNOSTIC STATUS

- [ ] CT available → N/CCT head STAT
- [ ] CT unavailable → Manage clinically as possible SAH

MEDICAL MANAGEMENT

- [ ] BP controlled conservatively (avoid extremes)
- [ ] Nimodipine started ASAP
- [ ] Analgesia + antiemetics
- [ ] Reverse anticoagulation if present

SECONDARY INJURY PREVENTION

- [ ] Head up 30°
- [ ] Avoid hypotension
- [ ] Avoid hypoxia
- [ ] Avoid fluid overload
- [ ] Treat fever

ESCALATION

- [ ] Early neurosurgical consultation (confirmed SAH)
- [ ] **Immediate transfer if CT unavailable**
- [ ] Clear documentation:
  - Time of onset
  - Neurological findings
  - BP trends
  - Treatments given and withheld

MONITOR FOR

- [ ] Sudden deterioration (rebleeding)
- [ ] ↓ GCS (hydrocephalus)
- [ ] Cardiac arrhythmias / ECG changes
- [ ] Electrolyte abnormalities (↓ Na^+)

DISPOSITION

- [ ] ICU / neurocritical care
- [ ] Nil by mouth
- [ ] Frequent neuro observations