

Subarachnoid Hemorrhage and Aneurysm

Most common cause of subarachnoid hemorrhage is trauma
Special subset of SAH is aneurysmal SAH

Ruptured aneurysms cause SAH, BUT SAH does not mean aneurysm
Aneurysmal SAH rare at 6-8 per 100,000
High Mortality from Aneurysmal Rupture ~45%
Vasospasm complication causes 7% death, 7% severe deficit
66% of survivors never return to same quality of life prior to SAH

Clinical Signs of SAH

Headache, Photophobia, Neck stiffness, Nausea, Vomiting, Decreased mental status, Ocular muscle palsy

Initial SAH Management - Unsecured Aneurysm (Pre clipping or coiling)

Airway - may require intubation for airway protection depending on neuro status
Sedation - Propofol if necessary, avoid unnecessary sedation to maintain ability to have accurate neuro exam
Hydrocephalus - ventriculostomy if hydrocephalus is present
BP management - In unsecured aneurysm, extreme hypertension can cause rebleed
Hypotension <120 can cause decreased cerebral perfusion, leading to stroke
maintain pressure 120-160 to decrease risk of rebleed, avoid hypertension
will require ART LINE pressure monitoring
Metoprolol, hydralazine, labetalol, may require drip (nicardipine, clevidipine)

Seizure Prophylaxis - SAH can cause seizure
prophylaxis with Phenytoin or Keppra

AVOID medications that lower seizure threshold (haloperidol, phenothiazines, etc)

Neuro Status

Must monitor Q1 to survey for neurologic decline

Diet

NPO except medications

Fluid

Foley Catheter for accurate Intake and Output records
NS 75/hr
Albumin 12.5g Q8
Fluids to maintain sodium, prevent cerebral salt wasting

Calcium Channel Blocker

Nimodipine 60mg Q4 - CCB for cerebral vasospasm prophylaxis

DVT prophylaxis

SCD

NO HEPARIN NO LOVENOX - severe bleed risk in active intracranial hemorrhage

GI Prophylaxis

H2 blocker

Anti-emetic

Zofran PRN

Avoid phenothiazines - lower seizure threshold

Labs

- BMP - follow Na, Q6 Na and OSM if hyponatremia
- CBC - follow HCT, platelets
- Coags
- ABG

Preop evaluation

- CXR
- EKG - SAH associated with cardiac arrhythmias, hypothalamic ischemia causing increased sympathetic tone leading to coronary ischemia

Identify Source of SAH

- CTA vs 4 vessel cerebral angiogram

Post Clipping or Coiling

When aneurysm is secured (clipping or coiling), risk of rebleeding is minimized

To prevent vasospasm, BP can ride 160s-200s depending on patient's autoregulation. Hypertension up to 220 or sometimes even 240 may be tolerated. This is a critical issue to discuss with Neurosurgery.

Vasospasm of cerebral vessels is common after aneurysmal SAH. Irritated vessels constrict and spasm, decreasing cerebral perfusion, which can lead to stroke.

Clinical signs: decreased level of consciousness, confusion, focal neurologic signs, weakness, paresthesias, aphasia, CN palsy

Vasospasm period - Post Bleed Day #3 - #14

Surveillance - TCD - doppler speeds can be elevated when vessels spasm >150cm/sec suggest spasm

Diagnosis - clinical exam prompting vessel study, CTA or Cerebral angiogram

Treatment - Triple H - Hypervolemia, Hypertension, Hemodilution

- Increase fluids - NS, Albumin

- Goal HCT <40%

- Hypertension - vasopressors or ionotropes may be required

- Invasive Cardiac Monitoring - Swan Ganz

 - Goal Cardiac Index >4- This is the most Critical

 - Central Venous Pressure >14

 - Pulmonary Capillary Wedge Pressure 18-20