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

*Updated 06/16/2010*