Aneurysmal Subarachnoid Hemorrhage

Prior to making any medical decisions, please view our disclaimer.

Pre Treatment

- Page neurosurgery
- Obtain CT/CTA
- Bedrest; NPO until treatment; Bowel regimen
- Blood Pressure: aim for SBP below 140

If systolic blood pressure is 140-230 mm Hg or if diastolic blood pressure is 90-120 mm Hg for two or more readings 5-10 minutes apart:

- Give intravenous labetolol per ICU protocol.
- Monitor blood pressure continuously during labetolol treatment and observe for development of hypotension.

If systolic blood pressure is > 230 mm Hg or if diastolic blood pressure is in the range of 121-140 mm Hg for two or more readings 5-10 minutes apart:

- Give intravenous labetolol per ICU protocol.
- Monitor blood pressure continuously during the labetolol treatment and observe for development of hypotension.
- If no satisfactory response, infuse sodium nitroprusside and titrate to necessary blood pressure.

If diastolic blood pressure is > 140 mm Hg for two or more readings 5-10 minutes apart:

- Infuse sodium nitroprusside and titrate to necessary blood pressure.

Anticonvulsant: Dilantin: i.v. (18mg/kg) load followed by p.o/pngt.

Nimodipine 60mg p.o./pngt q4

Pneumoboots (if patient is transferred from an outside hospital, need to be cleared for pneumoboots)

EVD, if placed, should be kept at or greater than 15 cm AEM and closed open for ICP greater than 20.

Avoid

- Decadron
- All anticoagulants and antiaggregants
- Nicotine patch

If treatment is delayed consider Amicar as per protocol

Post treatment

EVD 10cm AEM and open. EVD should start to be weaned after vasospasm has resolved or vasospasm peak period has passed for higher grades. For good grade patients can start to wean after day 4

TCDs: daily for a maximum of 21 post bleed.

Blood pressure needs to be liberalized 24 hours post surgery, aim for systolic below 200mmHg, regardless of treatment modality or of the presence of a 2nd unruptured aneurysm.

Nimodipine: if BP drop with Nimodipine, consider reducing doses and decreasing intervals or changing to continuous Nicardipine i.v at vasospasm dose as per protocol.
Anticonvulsant: D/C anticonvulsant immediately post-op day 1 for Hunt and Hess grades 1 and 2. Continue for higher grades till day 15; d/c after eeg free of epileptiform activity

s.q. heparin (Fragmin 5000U qd) should be started 48 hours after surgery

All patients need to be maintained euvoletic with a CVP > 6, use crystalloid

Start Florinef 0.1mg bid in all patients post-op if Na below 140 (so long as no cardiac contraindication) and hold for Na above 140.

For salt wasting and sodium less then 135, start salt tablets (max 3gm tid) until sodium is corrected

**Vasospasm**

If TCDs shows vasospasm (PSV > 200):

- HH grade 1 and 2, no need for prophylactic triple H, follow clinical exam
- HH grade 3-5 will require prophylactic triple H

Use phnylephrine for induced hypertension as first agent and Albumin for hypervolemia.

If BP can not be raised with phenylephrine alone consider Echocardiogram to check for reduced EF or other cause.

If EF is depressed and there is need to increase BP or to increase volume consider placing a Swann Ganz catheter.

**Algorithm for angiography in patients at risk for vasospasm after SAH.**

1. The ICU fellows will routinely notify the neurointerventional fellows of any new SAH admission to the unit. The condition of each patient with SAH will be discussed with the neurointerventional fellows during their evening rounds.
2. Angiography is indicated if:
   - neurologic worsening thought due to vasospasm regardless of medical therapy response
   - patient already with poor neurologic status and on maximum medical therapy with severe vasospasm by TCD.
   - poor neurologic status, question of vasospasm by TCD and unable to tolerate triple H therapy or unable to monitor TCD due to poor bony window/technical factors
3. Patients who are identified on early morning rounds by the fellow as fitting the above criteria will be discussed with NICU staff before 8 am and decision made to send for angio, or for further observation, or further diagnostic tests (CT,CTA). CTA should not be used as an additional screening tool and therefore should not delay the decision for angio.
4. Vasospasm is a dynamic process and unexpected events could trigger a call to the neuro-embo team at any time during the day or night. There should have a low threshold for angiogram. The complications of an angiogram are extremely low compared to the complications of untreated vasospasm.

**Authoring Information**

Reviewed/Approved by: Schwamm, Lee, M.D. on behalf of ASQT

Last updated: 12/23/2009