

GUIDELINES FOR MANAGING SICU PATIENTS WITH NEUROSURGICAL ISSUES

Post Operative Craniotomy/ General Issues for Patients with or at risk for CNS Injury

1. A hand off should occur between NS resident and ICU resident at the time of admission to the ICU. Key issues must be discussed and a neurologic exam done with both residents so a baseline can be agreed upon. The NS resident needs to call SICU to accept the patient and the SICU resident must be present at the bedside at time of patient arrival.
2. ANY deviation from that base line exam needs to prompt and IMMEDIATE call to the NS resident.
3. Agitation, delirium, or severe pain are unusual and are a sign of a problem. NS should be contacted. NO haldol or sedation should be administered without discussing this with NS first.
4. Any use of non-invasive BiPAP or CPAP needs to be approved by NS.
5. Use of D5 and LR should be avoided in postop crani's or any patient considered at risk for brain injury.
6. Hypotension, even moderate, is to be avoided in all patients with or at risk of CNS injury (this includes SCI).
7. Agents known to decrease seizure threshold like Haldol, Compazine, etc. are to be avoided.
8. Early nutrition is important and should be accomplished.
9. Both hyperglycemia and hypoglycemia are particularly dangerous to the injured brain. Tight control of glucose levels is desired. Frequent use of steroids in the NS patients thus may warrant the need for insulin drips/SS.
10. If imaging studies of the CNS are needed, please discuss with NS. Immediate review of said studies needs to be performed by the NS residents in the instance of patient with deteriorated exam.
11. If you do not fully understand the nature and the extent of injury/ manipulation that a patient has sustained, review any changes in management with NS or SICU Staff.

SAH/Aneurysms

1. A hand off should occur between NS resident and ICU resident at the time of admission to the ICU. Key issues must be discussed and a neurologic exam performed with both residents so a baseline can be agreed upon. The NS resident needs to call SICU to accept the patient and the SICU resident must be present at the bedside at time of patient arrival.
2. Sedation, if needed, should be a short acting agent. Frequent accurate neurological assessments are critical if good outcomes are to be achieved.
3. Increasing agitation can be a sign of VASOSPASM. NS needs to be notified as a CT, TCD or angiogram may be warranted. Haldol and other meds in general should not be used. If workup is proceeding or control of agitation is needed, sedation needs to be cleared with the SICU attending and NS must aware.

4. If the patient is in spasm then "triple H" therapy will often be started. This consists of hypervolemia, hyperdynamic therapy and hypertension. SICU should discuss parameters daily with NS. In general:
 - Maintain CI > 4
 - Maintain wedge of 14
 - SBP up to 180-200 is commonly used (SBP above 200mm Hg is sometimes necessary), antihypertensives are not to be used without discussing with NS.
 - Choice of pressor depends on patient status and co-morbidities.
 - Albumin is used. However, albumin should not be used as a q2 hour med unless a starling curve and correlating exam are being followed.

Central Diabetes Insipidus

1. DI is rare but possible after pituitary surgery, or surgery in the parasellar region. Only SHORT ACTING agents should be used. NS should ALWAYS be notified. Suspect DI when UOP is > 300cc/hr x 2 hours, Na > 145, and urine shows a specific gravity < 1.005.
Medications:
First dose: DDAVP 1-2U IV x 1

Traumatic Brain Injury

1. Follow the management guideline.
 2. Pre-injury anticoagulants: If the patient has a history of ASA or Plavix use, a dose of platelets should be given on arrival if not done in the ED. If the patient has a history of Coumadin use and a significant brain bleed then Bebulin should be used and dosed per the reversal algorithm.
 3. There is NO indication for the use of steroids to reduce cerebral edema and steroids should NOT be used for this purpose. The patient may have other indications (ie steroid dependent asthma, airway edema or adrenal insufficiency). If you have questions, ask.
 4. The patient should have daily CT brain until the bleed is stable, typically the need for CT will be determined by NS. If additional imaging is needed, please discuss with NS.
 5. Notify NS immediately if there is a decrease in mental status, increasing agitation, or a new focal exam finding.
 6. Do NOT use non-invasive CPAP or BiPAP on a lethargic patient. If the patient needs this level of support then endotracheal intubation should be considered urgently.
 7. Seizure prophylaxis should be used for 7 days. Dilantin is preferred, weight based dosing should be utilized and levels will be needed, discuss with pharmacy. If the patient has a seizure, NS needs to be notified and then the medication will need to be continued.
 8. DVT prophylaxis: SCDs should be placed on admission to the ICU. At 72 hours, Lovenox may be considered if the bleed is stable. If initiated, a CT brain should be done the next day to ensure no change. Dosing: isolated 40mg q day, poly trauma 30mg bid
- CONTRA-INDICATIONS**
- Indwelling ventric or bolt
 - Progression of bleed
 - Bleed causing severe shift or edema- discuss with attending.
 - If obvious contra-indications then request filter early.

INITIATION OF LOVENOX IS AN ATTENDING DECISION.

9. NS should not sign off a patient if the bleed is not stable, ventric or bolt is still in place, 3% saline or barbiturate coma is being utilized unless the NS, ICU, and Trauma attendings agree on this.

Ventriculostomies

1. Ventrics at this institution are antibiotic impregnated. 2gm Rocephin should be administered at time of placement. Continuous, systemic antibiotics are not required.
For PCN/cephalosporin allergy use: Vancomycin 15mg/kg q12 hours x 24 hours . CSF needs to be monitored qOD at a minimum to insure no leukocytosis. Increasing WBC in the CSF may be an indication that the ventric needs to be changed.
2. A patient CAN be out of bed with a ventric. This does required attention to patient position.

Continuous 3% saline

Cerebral Edema

1. 3% NS at 30ml/hr is sometimes used. The patient should have Na and osm checked q6 hours. If the ICP is controlled the continued use should be reconsidered at 48 hours. In general, 3% should be stopped if Na > 155 unless ICPs are out of control and this is salvage therapy.

Hyponatremia

1. A patient can build tolerance or have a paradoxical response. Follow urine Na, if this is increasing; the 3% is ineffective and should be stopped. Consider .9% NS and Lasix to decrease free H₂O.
2. Consider Conivaptan (Vaprisol) if the patient is euvolemic. This is a restricted medication and can only be utilized in certain patient care settings.

LABS

1. For severe TBI and aneurysms serial labs should be followed for the first 72 hours (Na, Osm, plt, PT/PTT). If there are no abnormalities lab frequency should be decreased unless there is another indication to continue.