

Hemorrhagic Stroke Stabilization Protocol

For patient diagnosed with acute non-traumatic intracranial hemorrhage (ICH or SAH)

Consult Neurosurgery and Neurocritical Care or consider transfer if not available locally

Use of an **Intracerebral hemorrhage (ICH) Order set** and **Subarachnoid Hemorrhage Order Set** is recommended

Monitor blood pressure every 15 minutes or less

- **SAH GOAL BP is < 140/90**
- **ICH GOAL SBP is 130 – 160**
lowering SBP < 130 is potentially harmful in ICH!

- **Labetalol 10-20 mg IV every 5-10 min**, up to 2 doses
 - May start with 5 mg in the elderly or low weight
- **If BP not at goal:**
- **Start Nicardipine gtt at 5 mg/hr**, increase by 2.5 mg/hr every 5 min to attain goal BP; Max 15 mg/hr
- **Alternative: Start Clevidipine IV at 1-2 mg/h**, increase by doubling the dose every 2-5 minutes as needed; Maximum 21 mg/hr

Review history of anti-coagulation use and obtain STAT CBC and coag panel

Warfarin
(Coumadin, Jantoven)

1. **Vitamin K 5 mg IV x1**
2. **4-Factor PCC (Kcentra) IV x1**
 - If INR 1.6-1.9, give 15 units/kg
 - If INR greater than or equal to 2.0, give 25 units/kg
3. **Repeat INR 30 min post-PCC dose.** If INR more than 1.5, give additional 10 units/kg

Direct thrombin inhibitor within 24 hrs (w/ normal renal function)

- Dabigatran (Pradaxa)

- **Idarucizumab 2.5 gm IV x2**, given 15 min apart (if available)
- Activated **charcoal** at standard doses if last dose was within 2 hours
- Maintain adequate **diuresis** with fluid replacement and hemodynamic support
- PCC, FFP and FVIIa do not appear to be effective & should **not** be administered
- **Hemodialysis** can be considered after transfer

Direct FXa inhibitor within 18 hrs

- Rivaroxaban (Xarelto)
- Apixaban (Eliquis)
- Edoxaban (Savaysa)

- **Andexanet alfa** may be considered if locally available, otherwise use KCentra
- **Kcentra 25 units/kg**
- Activated **charcoal** at standard doses if last dose was within 1-2 hours
- Maintain adequate **diuresis** with fluid replacement and hemodynamic support
- Hemodialysis is **not** indicated

IV Unfractionated Heparin

1 mg **protamine** per 100 units of heparin given over last 2 hours (ex. 1000 units/hr infusion x 2 hours = 2,000 units UFH = 20 mg protamine); Max 50 mg protamine

Low Molecular Weight Heparin

If last administration less than 8 hours ago: 1 mg **protamine** per 1 mg LMWH; Max 50 mg
If last administration greater than 8 hours ago: 0.5 mg protamine per 1 mg LMWH; Max 50 mg

Platelets less than 10,000

- **Platelet transfusion is potentially harmful** and should **not** be administered in the absence of plan for emergent neurosurgical intervention
- The effectiveness of desmopressin to reduce hematoma expansion is uncertain

Patients with signs/symptoms of increased intracranial pressure[§]

Prophylactic osmotic therapy is not recommended

- Administer **mannitol 1 gm/kg IV x1** or hypertonic saline per critical care recs
- Keep head of bed greater than 30 degrees
- Appropriate use of ventilator support and use end-tidal CO₂ monitoring
- Transfer for Neurosurgical intervention if in line with patients goals of care

Recommend use of an **ICP Crisis Order Set**

Non-traumatic subarachnoid hemorrhage

Prophylactic antiseizure medication should not be routinely used but can be considered in high-risk patients

- Nimodipine 60 mg PO/per NGT
- IVF to maintain euvoolemia
- If patient has a seizure: **levetiracetam 2000 mg IV x1** followed by 1000 - 1500 mg q12 hours
- **Phenytoin use is associated with excess morbidity and should be avoided**

§Headache, nausea, vomiting, diplopia, anisocoria, increased blood pressure, slow heart rate, altered respiratory pattern, seizures, confusion, depressed level of consciousness, coma

References:

- 2022 American Heart Association/American Stroke Association Guidelines for the Management of Spontaneous Intracerebral Hemorrhage Stroke.2022;53.
- 2023 Guideline for the Management of Patients With Aneurysmal Subarachnoid Hemorrhage: A Guideline From the American Heart Association/American Stroke Association. Stroke. 2023;54:e314–e370.